



Taxonomic Paper

Megafauna of the UKSRL exploration contract area and eastern Clarion-Clipperton Zone in the Pacific Ocean: Annelida, Arthropoda, Bryozoa, Chordata, Ctenophora, Mollusca

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Abstract

Background

There is growing interest in mining polymetallic nodules from the abyssal Clarion-Clipperton Zone (CCZ) in the tropical Pacific Ocean. Despite having been the focus of environmental studies for decades, the benthic megafauna of the CCZ remain poorly known. To predict and manage the environmental impacts of mining in the CCZ, baseline knowledge of the megafauna is essential. The ABYSSLINE Project has conducted benthic biological baseline surveys in the UK Seabed Resources Ltd polymetallic-nodule

exploration contract area (UK-1). Prior to ABYSSLINE research cruises in 2013 and 2015, no biological studies had been done in this area of the eastern CCZ.

New information

Using a Remotely Operated Vehicle and Autonomous Underwater Vehicle (as well as several other pieces of equipment), the megafauna within the UK Seabed Resources Ltd exploration contract area (UK-1) and at a site ~250 km east of the UK-1 area were surveyed, allowing us to make the first estimates of megafaunal morphospecies richness from the imagery collected. Here, we present an atlas of the abyssal annelid, arthropod, bryozoan, chordate, ctenophore and molluscan megafauna observed and collected during the ABYSSLINE cruises to the UK-1 polymetallic-nodule exploration contract area in the CCZ. There appear to be at least 55 distinct morphospecies (8 Annelida, 12 Arthropoda, 4 Bryozoa, 22 Chordata, 5 Ctenophora, and 4 Mollusca) identified mostly by morphology but also using molecular barcoding for a limited number of animals that were collected. This atlas will aid the synthesis of megafaunal presence/absence data collected by contractors, scientists and other stakeholders undertaking work in the CCZ, ultimately helping to decipher the biogeography of the megafauna in this threatened habitat.

Keywords

deep-sea mining, polymetallic nodule, Clarion-Clipperton Zone, megafauna, atlas

Introduction

The Clarion-Clipperton Zone (CCZ) is an abyssal region of the tropical eastern Pacific Ocean where deep-sea mining may take place in the near future (Ramirez-Llodra et al. 2011, Wedding et al. 2013; Fig. 1). High-grade polymetallic nodules, which could provide a commercial source of copper, cobalt, nickel, and manganese (among other metals), are abundant in this six million km² region that lies in Areas Beyond National Jurisdiction (ABNJ), and thus falls under the legal mandate of the International Seabed Authority (ISA) (Wedding et al. 2013). Thus far, 16 exploration leases (each up to 75,000 km² in area) have been granted by the ISA in the CCZ, with those for exploitation expected to soon follow (<https://www.isa.org.jm/>).

The ABYSSLINE (ABYSSal BaseLINE) Project was designed to undertake benthic biological baseline studies in accordance with ISA environmental guidelines within the UK Seabed Resources Ltd (UKSRL) exploration contract area (UK-1) (Amon et al. 2016). The UK-1 exploration contract area is one of the easternmost contract areas in the CCZ and encompasses ~58,000 km² of seafloor (Fig. 1). The ABYSSLINE Project was led by scientists from the University of Hawai'i at Mānoa (USA), and included scientists from Hawai'i Pacific University (USA), the Natural History Museum, London (UK), the National

Oceanography Centre, Southampton (UK), Senckenberg Gesellschaft für Naturforschung (Germany), Uni Research (Norway), and the International Research Institute of Stavanger (Norway). The ABYSSLINE Project aimed to evaluate baseline conditions of community structure and biodiversity for megafauna, macrofauna, meiofauna and microbes within the UK-1 contract area and across the CCZ (Amon et al. 2016, Amon et al. 2016, Amon et al. 2017, Dahlgren et al. 2016, Glover et al. 2016, Glover et al. 2015, Leitner et al. 2017, Shulze et al. 2016). No faunal studies had been undertaken in the UK-1 contract area prior to licensing by the ISA in 2013 and the commencement of the ABYSSLINE Project.

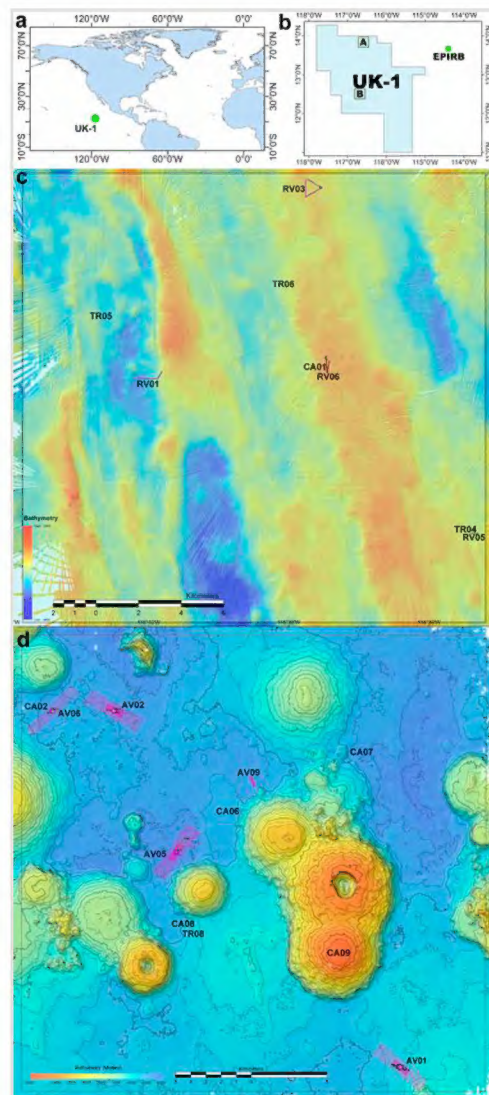


Figure 1. [doi](#)

Locations of megafaunal surveys during the ABYSSLINE cruises, AB01 and AB02, in the Clarion-Clipperton Zone. (a) The location of the UK Seabed Resources Ltd exploration contract area (UK-1) in the eastern Pacific Ocean. (b) The locations of the 30x30-km survey areas, UK-1 Stratum A and UK-1 Stratum B, in relation to the UK-1 exploration contract area and the AB01 ROV dive site, EPIRB, which was approximately 250 km east of the UK-1 contract area. (c) The locations of ROV dives within UK-1 Stratum A, indicated by purple tracklines labelled with the dive number (e.g. RV01). Stations where imagery was collected with a baited camera (CA01) and samples collected with a baited trap (TR04, TR05, TR06) are also indicated. (d) The locations of AUV dives within UK-1 Stratum B, indicated by purple tracklines labelled with the dive number (e.g. AV01). Stations where imagery was collected with a baited camera (CA02, CA06, CA07, CA08, CA09) and samples collected with a baited trap (TR08) are also indicated. All maps were created by Seafloor Investigations Ltd for the ABYSSLINE Project using ArcGIS software (<https://www.arcgis.com/features/>).

It is expected that nodule mining will drastically alter this unique deep-sea habitat with recovery expected to be slow (Amon et al. 2016, Jones et al. 2017, Oebius et al. 2001, Ramirez-Llodra et al. 2011, Vanreusel et al. 2016) and yet, despite increases in technology and the number of expeditions to the area, very little is known about the ecology and biogeography of the fauna inhabiting the region (Amon et al. 2016, Amon et al. 2016, Amon et al. 2017, Bluhm and Gebruk 1999, Dahlgren et al. 2016, Foell and Pawson 1986, Glover et al. 2016, Jones et al. 2017, Leitner et al. 2017, Martinez-Arbizu et al. 2013, Pawson 1983, Pawson and Foell 1986, Roux 2004, Roux and Pawson 1999, Shulze et al. 2016, Tilot 2006, Vanreusel et al. 2016, Vecchione 2016, Wang and Lu 2002). The megafauna constitute an important component of the biodiversity in the abyssal deep sea and play a significant role in deep-sea ecosystem function (Amon et al. 2016, Amon et al. 2017, Amon et al. 2016, Leitner et al. 2017, Smith et al. 2008, Vanreusel et al. 2016). Amon et al. 2016 could not locate a single megafauna record for the UK-1 exploration contract area in OBIS or elsewhere. This is likely the result of a lack of sampling, complete taxonomic identification of specimens and/or ensuring data are publicly available, especially as an abundant and diverse megafauna is already known from the CCZ from photographic and video surveys (Amon et al. 2016, Amon et al. 2017, Amon et al. 2016, Dahlgren et al. 2016, Foell and Pawson 1986, Glover et al. 2016, Leitner et al. 2017, Martinez-Arbizu et al. 2013, Pawson 1983, Pawson and Foell 1986, Tilot 2006, Vanreusel et al. 2016, Vecchione 2016, Wang and Lu 2002). To predict and manage the environmental impacts of mining in the CCZ and within the UK-1 exploration contract area, baseline knowledge of the megafauna is essential; in addition, it will allow for a future complete taxonomic and biogeographic synthesis of the fauna of the CCZ (Wedding et al. 2015).

Here, we present the second section (Annelida, Arthropoda, Bryozoa, Chordata, Ctenophora, and Mollusca) of an anticipated four-section image atlas of benthic megafauna that inhabit the UK-1 exploration contract area based on ROV and AUV surveys and samples collected during two cruises of the ABYSSLINE project. The first in this series (Echinodermata) has already been published (Amon et al. 2017). These two sections will be supported by Cnidaria and Porifera sections in the near future. This atlas was crucial during the ABYSSLINE quantitative megafaunal analyses (Amon et al. 2016) and we hope that it will help standardize putative morphospecies and be useful to other scientists and stakeholders undertaking research in the CCZ in the future.

Materials and methods

The UKSRL exploration contract area (UK-1) is located in the eastern CCZ in the Pacific Ocean (Fig. 1). There were two ABYSSLINE research cruises to the UK-1 exploration contract area: the AB01 or MV1313 cruise on the R/V *Melville* from 3 to 27 October 2013, and the AB02 or TN319 cruise on the R/V *Thompson* from 12 February to 25 March 2015. The AB01 cruise focused on a 30x30-km stratum (UK-1 Stratum A) centered at 13°49' N, 116°36' W in the northern portion of the UK-1 contract area (Fig. 1). During the AB01 cruise, multibeam bathymetric surveys indicated an abyssal seafloor characterized by ridges and valleys running from NNW to SSE at 3900–4400 m. The commercial Remotely

Operated Vehicle (ROV) *Remora III*, operated by Phoenix International Holdings, performed video surveys and sample collections at four randomly-located sites within UK-1 Stratum A in the UK-1 contract area. Additionally, surveys were done ~250 km to the east of the UK-1 contract area, at a site called "EPIRB" centered at 13°40' N, 114°24' W (Fig. 1). Work at the EPIRB site was dictated by an emergency response to an Emergency Position Indicating Radio Beacon (EPIRB) distress signal and, although unplanned, provided a useful broader context for our study.

The ROV was equipped with two manipulators, four ROS QLEDIII lights, one 1Cam Alpha Component high-definition downward-looking "science" video camera (1080p video and 24.1 megapixel stills) and one standard-definition forward-looking "pilot" video camera. During surveys, the vehicle had substantial difficulty maintaining constant altitude, direction and velocity over the seabed, thereby limiting both the usable imagery and specimens collected.

The AB02 cruise focused on a 30x30-km stratum (UK-1 Stratum B) centered at 12°28' N, 116°36' W in the central portion of the UK-1 exploration contract area (Fig. 1). During the AB02 cruise, multibeam bathymetric surveys indicated an abyssal seafloor dominated by numerous high-relief volcanic seamounts between 3500-4300 m (Fig. 1). The Autonomous Underwater Vehicle (AUV) *REMUS 6000*, operated by Woods Hole Oceanographic Institution, performed image surveys at five randomly-located sites within UK-1 Stratum B (Fig. 1). The AUV was equipped with four ROS QLEDIII lights, and one Prosilica GT3400 high-definition downward-looking still camera (9 megapixel stills).

During both AB01 and AB02, two baited camera systems were also used to collect video of scavenging arthropods and fishes at random locations in both the UK-1 Stratum A and UK-1 Stratum B (Leitner et al. 2017).

Sample collection

The ROV was the primary tool used to collect specimens on the AB01 cruise, however due to significant difficulties, few megafauna were successfully sampled (Amon et al. 2016). Additionally, scavenging arthropods and fishes were captured in a baited trap during both AB01 and AB02 (Leitner et al. 2017). Once the respective sampling equipment was on deck, megafauna were quickly transferred to containers of chilled seawater, photographed, and a tissue subsample taken for DNA analyses. DNA samples were preserved in 80% ethanol and the remainder of the animal was preserved in buffered 4% formalin-seawater solution or 95% ethanol, depending on the taxon. On board, all collected specimens were also imaged, with the resulting images included in this manuscript. After the cruise, morphological samples were sent to taxonomic experts for identification and all specimens sequenced for a range of DNA markers at the Natural History Museum, London, with tissue samples subsequently archived and made openly available for future taxonomic work (Dahlgren et al. 2016, Glover et al. 2015, Glover et al. 2016). All collected specimens were used for taxonomic identifications including ground-truthing identifications based on images.

Megafaunal image surveys and analyses

All imagery from both "pilot" and "science" cameras on the ROV (covering roughly 8,000 m²) collected during AB01 was used during the creation of this atlas (Amon et al. 2016, Amon et al. 2017). All imagery from the AUV (27,178 images covering roughly 500,000 m²) collected during AB02 was also used, although the majority of these images (>20,000 images) were at too high an altitude (>6 m) for megafauna to be resolved and identified. All video from both cameras on the ROV, as well as from the AUV, were viewed multiple times and frames archived of each identifiable megafaunal morphotype or morphospecies.

The criteria used for selection of megafaunal morphospecies during AB01 was that individuals were >2 cm in maximum dimension and that there was sufficient detail to identify them to a putative "species-level" morphotype (Amon et al. 2016). The AUV imagery collected during AB02 was lower resolution forcing the criteria to be modified to megafauna >5 cm only being included. Morphospecies that could not be identified to species but appeared morphologically distinct were assigned a unique informal species name (e.g. Polychaeta morphospecies 1). These were identified by taxonomic experts or by using the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (<http://ccfzatlas.com/>) (Foell and Pawson 1986, Martinez-Arbizu et al. 2013, Tilot 2006). Morphospecies from this study that matched morphotypes listed in the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone (Martinez-Arbizu et al. 2013)" have had a section titled 'Nomenclature' added to their data, which includes their identification from the online atlas. This is in an effort to provide coherence between these CCZ atlases. For morphospecies that were morphologically similar to a well-defined species name, we use the open nomenclature expression "cf.", although a precautionary approach was taken.

This process estimated the number of annelid, arthropod, bryozoan, chordate, ctenophore and mollusc megafauna morphospecies in the UK-1 contract area and eastern CCZ, and will aid in delimiting species ranges in the CCZ. A concise list of morphospecies and their respective locations can be found in the Suppl. material 1. However, since the majority of the morphospecies were not collected, it is impossible to confirm species identities in most cases or undertake systematic studies on this fauna (Amon et al. 2016, Amon et al. 2017).

Annelids of the UKSRL exploration contract area (UK-1) and the eastern Clarion-Clipperton Zone

Phylum Annelida Lamarck, 1809

Class Polychaeta Grube, 1850

cf. Polychaeta morphospecies

Material

- a. scientificName: Polychaeta sp.; taxonConceptID: cf. Polychaeta morphospecies; kingdom: Animalia; phylum: Annelida; class: Polychaeta; taxonRank: class; scientificNameAuthorship: Grube, 1850; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4035; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8637; decimalLongitude: -116.5461; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 1:09; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Seen on seafloor. No additional distinguishing features to place it beyond class Polychaeta.

Fig. 2



Figure 2. [doi](https://doi.org/10.1038/srep30492)

cf. Polychaeta morphospecies in situ on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Order Phyllodocida Dales, 1962

Family Polynoidae Kinberg, 1856

cf. Polynoidae morphospecies

Material

- a. scientificName: Polynoidae sp.; taxonConceptID: cf. Polynoidae morphospecies; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Phyllodocida; family: Polynoidae; taxonRank: family; scientificNameAuthorship: Kinberg, 1856; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4222; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5849; decimalLongitude: -116.7102; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 14:37; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Distinct segments and thick parapodia visible. Pennate shape with body narrowing toward anterior and posterior. Often swimming near the benthos.

Fig. 3



Figure 3. [doi](#)

cf. Polynoidae morphospecies in situ swimming above the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: Woods Hole Oceanographic Institution.

Order Sabellida

Family Sabellidae Latreille, 1825

cf. Sabellidae morphospecies 1

Materials

- a. scientificName: Sabellidae sp.; taxonConceptID: cf. Sabellidae morphospecies 1; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Sabellida; family: Sabellidae; taxonRank: family; scientificNameAuthorship: Latreille, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4029; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8633; decimalLongitude: -116.5464; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 9:11; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: Sabellidae sp.; taxonConceptID: cf. Sabellidae morphospecies 1; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Sabellida; family: Sabellidae; taxonRank: family; scientificNameAuthorship: Latreille, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3934; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4105; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 12:28; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Long, straight, and smooth tube emerging from seafloor with conical whorl of feathery tentacles at anterior.

Fig. 4

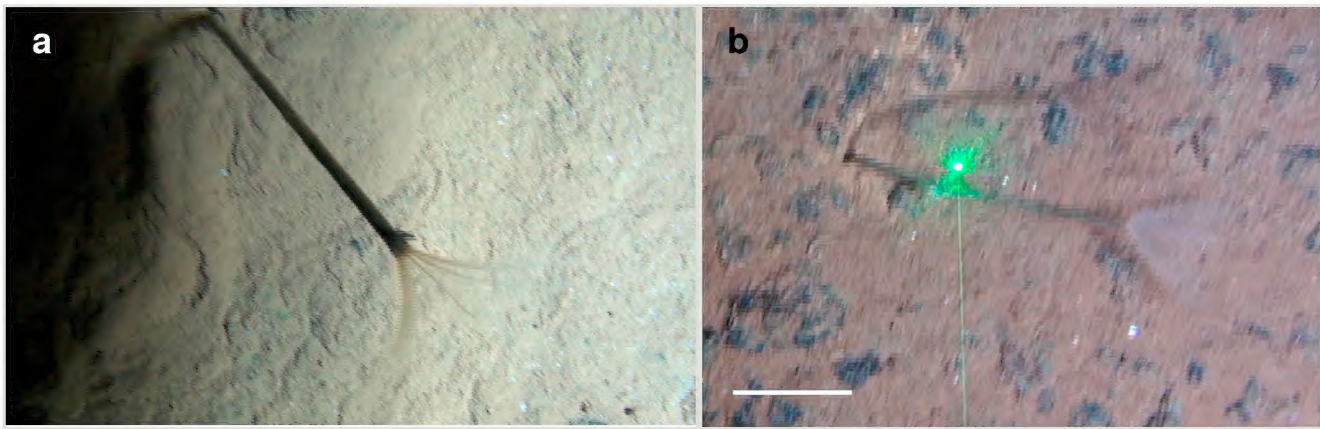


Figure 4.

cf. Sabellidae morphospecies 1 observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the relevant data above.

a: cf. Sabellidae morphospecies 1 in situ on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. Sabellidae morphospecies 1 in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

cf. Sabellidae morphospecies 2

Material

- a. scientificName: Sabellidae sp.; taxonConceptID: cf. Sabellidae morphospecies 2; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Sabellida; family: Sabellidae; taxonRank: family; scientificNameAuthorship: Latreille, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3950; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4142; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 9:51; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Thick tube seen protruding from sediment or attached to hard substrate. Whorl of feathery tentacles visible at anterior.

Fig. 5



Figure 5. [doi](#)

cf. Sabellidae morphospecies 2 attached to a polymetallic nodule on the seafloor in the eastern CCZ. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Family Serpulidae Rafinesque, 1815

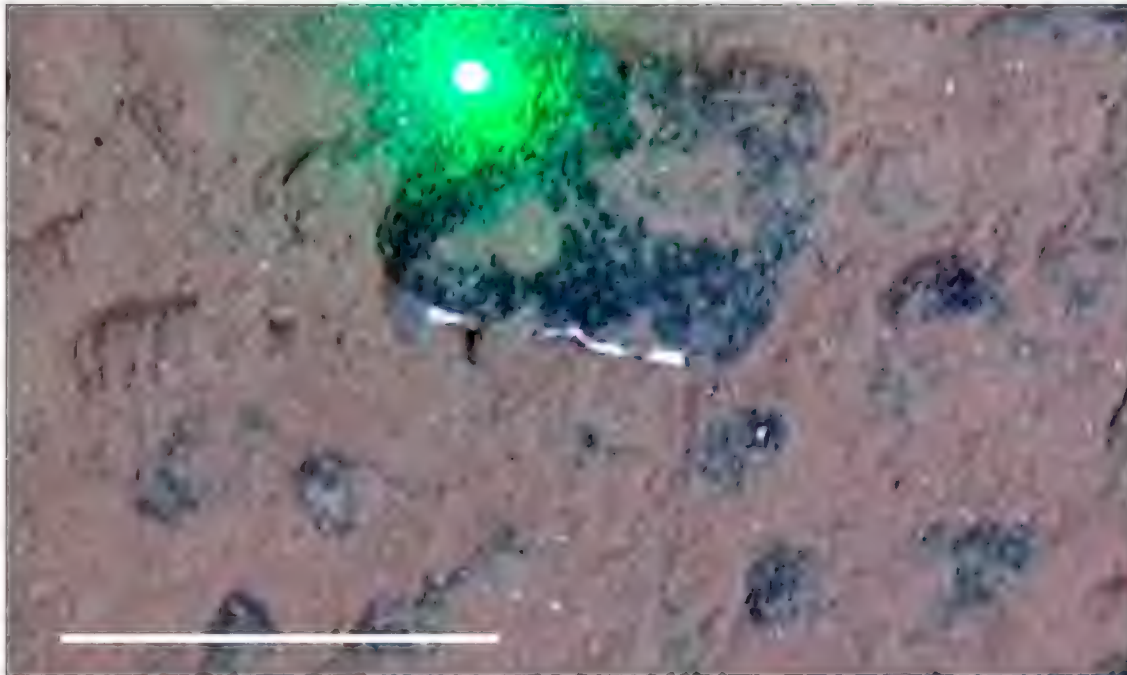
cf. Serpulidae morphospecies 1

Material

- a. scientificName: Serpulidae sp.; taxonConceptID: cf. Serpulidae morphospecies 1; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Sabellida; family: Serpulidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1815; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4024; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8561; decimalLongitude: -116.5476; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 2:59; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: White calcareous tube attached flat to hard substrate with feathery tentacles visible protruding from anterior end of tube.

Fig. 6

Figure 6. [doi](#)

cf. Serpulidae morphospecies 1 attached to a polymetallic nodule on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

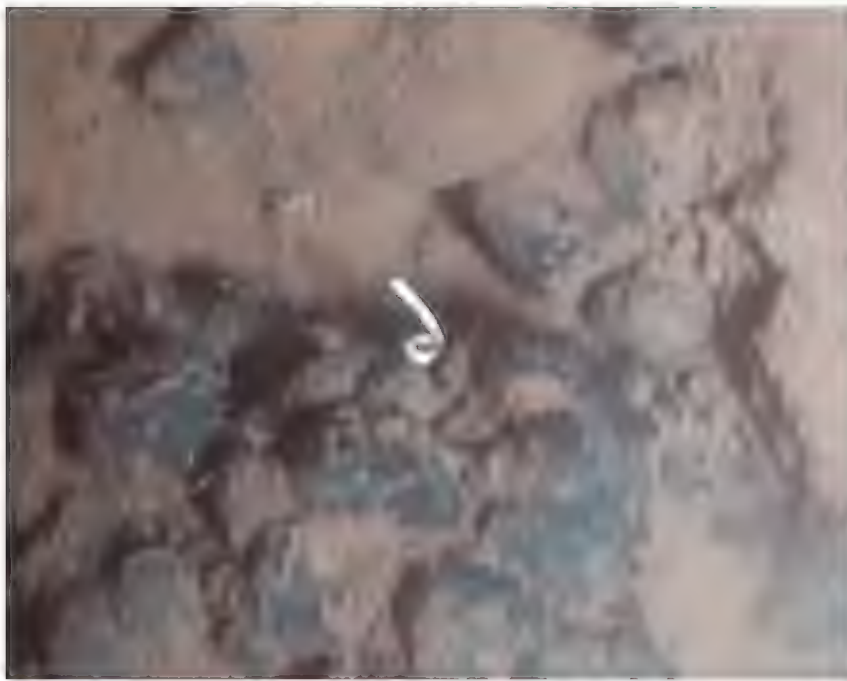
cf. Serpulidae morphospecies 2

Material

- a. scientificName: Serpulidae sp.; taxonConceptID: cf. Serpulidae morphospecies 2; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Sabellida; family: Serpulidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1815; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4109; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8498; decimalLongitude: -116.6457; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 12:40; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: White calcareous tube seen projecting off hard substrate into water column with feathery tentacles visible from anterior.

Fig. 7

Figure 7. [doi](#)

cf. Serpulidae morphospecies 2 attached to a polymetallic nodule on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

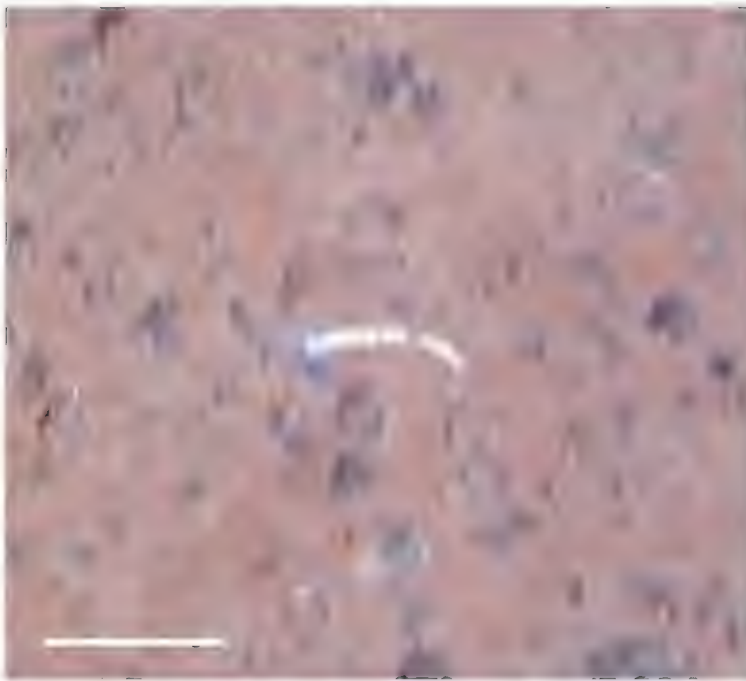
cf. Serpulidae morphospecies 3

Material

- a. scientificName: Serpulidae sp.; taxonConceptID: cf. Serpulidae morphospecies 3; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Sabellida; family: Serpulidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1815; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3934; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6791; decimalLongitude: -114.4104; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 10:34; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: White calcareous tube with whorl of feathery tentacles visible from anterior end of tube seen on soft sediment.

Fig. 8

Figure 8. [doi](#)

cf. Serpulidae morphospecies 3 in situ on the seafloor in the eastern CCZ. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Order Terebellida sensu Rouse & Fauchald, 1997

Family Acrocirridae Banse, 1969

cf. Acrocirridae morphospecies

Material

- a. scientificName: Acrocirridae sp.; taxonConceptID: cf. Acrocirridae morphospecies; kingdom: Animalia; phylum: Annelida; class: Polychaeta; order: Terebellida; family: Acrocirridae; taxonRank: family; scientificNameAuthorship: Banse, 1969; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3915; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6785; decimalLongitude: -114.4067; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:14; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Adrian Glover, Helena Wiklund, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Distinct segments visible with long, paddle-like parapodia. Often swimming near the benthos.

Fig. 9

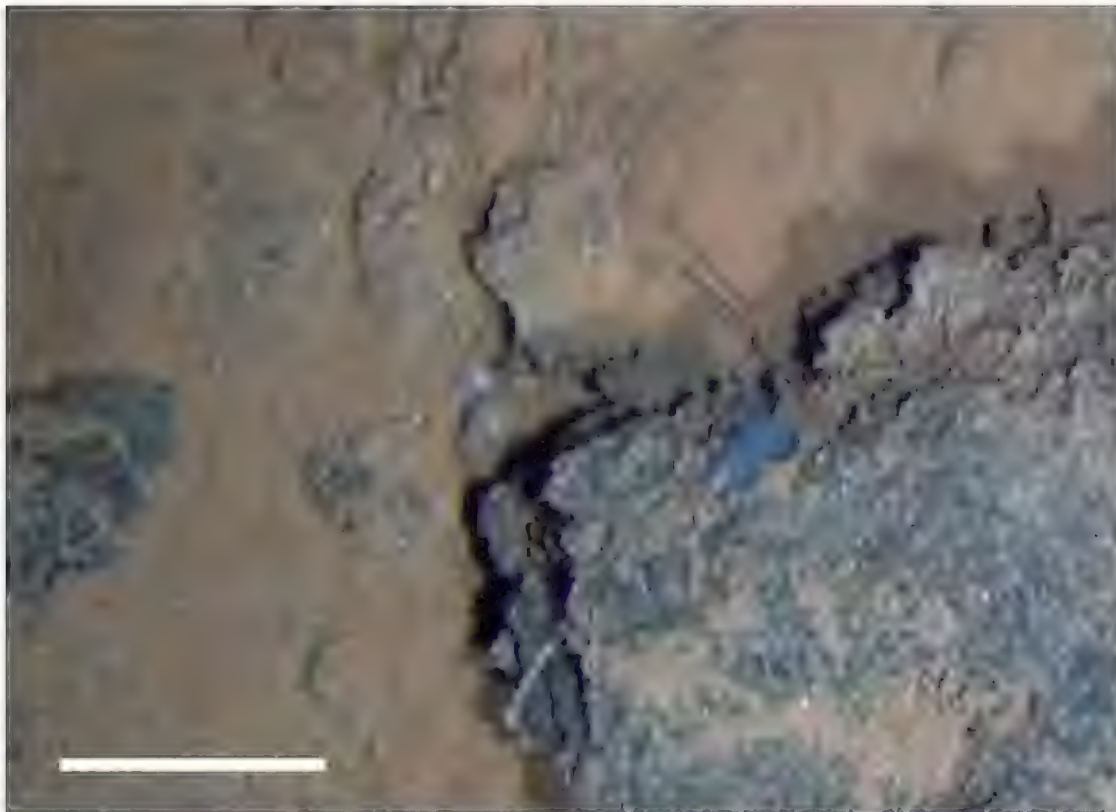


Figure 9. [doi](#)

cf. Acrocirridae morphospecies in situ swimming above the seafloor in the eastern CCZ. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Arthropods of the UKSRL exploration contract area (UK-1) and the eastern Clarion-Clipperton Zone

Phylum Arthropoda von Siebold, 1848

Class Malacostraca Latreille, 1802

Order Amphipoda Latreille, 1816

Family Eurytheneidae Stoddart & Lowry, 2004

Genus *Eurythenes* Smith in Scudder, 1882

cf. *Eurythenes* morphospecies 1

Material

- a. scientificName: *Eurythenes* sp.; taxonConceptID: cf. *Eurythenes* morphospecies 1; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Amphipoda; family: Eurythenidae; taxonRank: genus; genus: *Eurythenes*; scientificNameAuthorship: Smith in Scudder, 1882; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4312; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5532; decimalLongitude: -116.5386; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-06; eventTime: 19:37; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA07; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Feeding on bait; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Colour is different so might be a different species than *E. magellanicus* but the body color in *Eurythenes* spp. varies according to the stage of the molt cycle.

Fig. 10



Figure 10. [doi](https://doi.org/10.1016/j.dsr.2017.04.017)

cf. *Eurythenes* morphospecies 1 in situ feeding on bait on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: A Leitner and J Drazen, University of Hawai'i.

Eurythenes magellanicus* H. Milne Edwards, 1848*Material**

- a. scientificName: *Eurythenes magellanicus*; taxonConceptID: *Eurythenes magellanicus*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Amphipoda; family: Eurythenidae; taxonRank: species; genus: *Eurythenes*; scientificNameAuthorship: H. Milne Edwards, 1848; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4170; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7615; decimalLongitude: -116.4655; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Trap; eventDate: 2013-10-17; eventTime: 7:13; habitat: Abyssal polymetallic-nodule field; fieldNumber: TR04; individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; catalogNumber: AB1-TR04-amph-5; recordNumber: AB1-TR04-amph-5; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; identifiedBy: Inga Mohrbeck, Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

Fig. 11



Figure 11.

Eurythenes magellanicus after collection via baited trap from the UK-1 exploration contract area. The carapace length of this specimen was 10 cm. Images (a-c) correspond with the data in (a) above.

a: Side view of *Eurythenes magellanicus* after collection. Image attribution: A Leitner and J Drazen. [doi](#)

b: Ventral view of *Eurythenes magellanicus* after collection. Image attribution: A Leitner and J Drazen. [doi](#)

c: Front view of *Eurythenes magellanicus* after collection. Image attribution: A Leitner and J Drazen. [doi](#)

Notes: This and other amphipods can be distinguished from "true shrimp" (Order Decapoda) by having NO carapace, sessile eyes (no stalks) and three pairs of terminal appendages (uropods). Species of *Eurythenes* are the largest deep-sea amphipods and often are attracted to bait. Notice that there are large coxal plates at the bases of the legs - these are absent in decapod shrimps.

Family Podoceridae Leach, 1814

cf. Podoceridae morphospecies

Material

- a. scientificName: Podoceridae sp.; taxonConceptID: cf. Podoceridae morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Amphipoda; family: Podoceridae; taxonRank: family; scientificNameAuthorship: Leach, 1814; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4073; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7603; decimalLongitude: -116.4678; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:45; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 2; lifeStage: Adult; preparations: Imaged only; behavior: On a sponge stalk; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 12



Figure 12. [doi](https://doi.org/10.1038/srep30492)

A pair (likely male and female) of cf. Podoceridae morphospecies in situ on a sponge stalk in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Notes: The very large dorsal spines on the posterior part of the body are diagnostic. Often found on stalks in pairs.

Order Decapoda Latreille, 1802

Family Aristeidae Wood-Mason in Wood-Mason & Alcock, 1891

Genus *Hemipenaeus* Spence Bate, 1881

Hemipenaeus cf. *spinidorsalis* Spence Bate, 1881

Materials

- a. scientificName: *Hemipenaeus spinidorsalis*; taxonConceptID: *Hemipenaeus* cf. *spinidorsalis*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Aristeidae; taxonRank: species; genus: *Hemipenaeus*; scientificNameAuthorship: Spence Bate, 1881; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4046; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8661; decimalLongitude: -116.5548; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2013-10-09; eventTime: 12:05; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA01; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Hemipenaeus spinidorsalis*; taxonConceptID: *Hemipenaeus* cf. *spinidorsalis*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Aristeidae; taxonRank: species; genus: *Hemipenaeus*; scientificNameAuthorship: Spence Bate, 1881; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4210; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5684; decimalLongitude: -116.7327; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 12:17; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: *Hemipenaeus spinidorsalis*; taxonConceptID: *Hemipenaeus* cf. *spinidorsalis*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Aristeidae; taxonRank: species; genus: *Hemipenaeus*; scientificNameAuthorship: SpenceBate, 1881; waterBody: Pacific Ocean; stateProvince:

Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4252; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5103; decimalLongitude: -116.6390; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 13:36; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- d. scientificName: *Hemipenaeus spinidorsalis*; taxonConceptID: *Hemipenaeus* cf. *spinidorsalis*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Aristeidae; taxonRank: species; genus: *Hemipenaeus*; scientificNameAuthorship: Spence Bate, 1881; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4312; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5532; decimalLongitude: -116.5386; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-05; eventTime: 19:37; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA07; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- e. scientificName: *Hemipenaeus spinidorsalis*; taxonConceptID: *Hemipenaeus* cf. *spinidorsalis*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Aristeidae; taxonRank: species; genus: *Hemipenaeus*; scientificNameAuthorship: Spence Bate, 1881; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4201; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.3836; decimalLongitude: -116.4907; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2013-10-19; eventTime: 17:01; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA01; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Red color, toothed rostrum, abdominal appendages very long and setose, antennal scale is round, not elongate-oval, able to swim readily. Likely to be *H. spinidorsalis* because this is the only species of the genus reported in this part of the Pacific.

Fig. 13

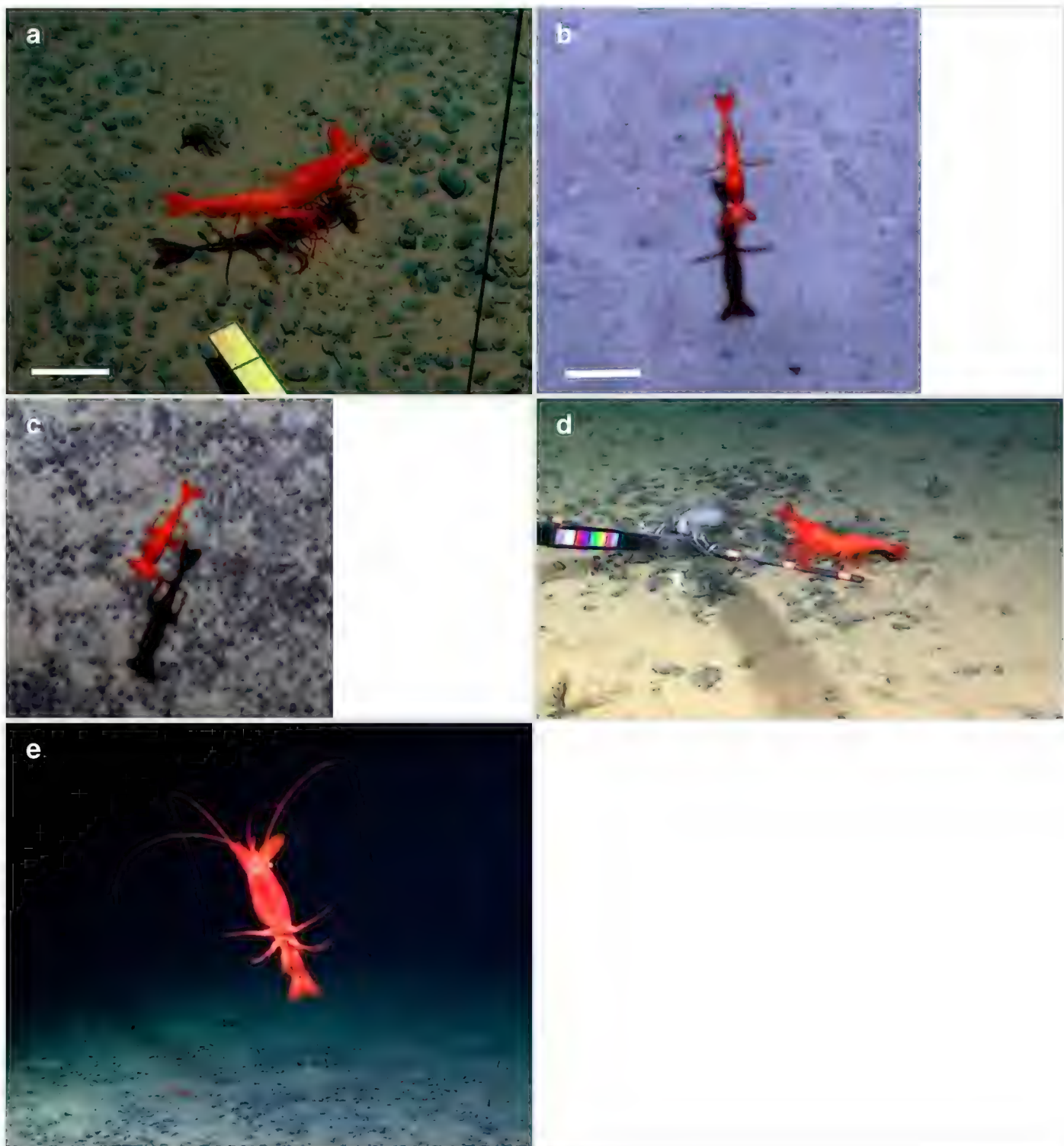


Figure 13.

Hemipenaeus cf. *spinidorsalis* observed in the UK-1 exploration contract area. Images (a-e) correspond with the relevant data above.

a: *Hemipenaeus* cf. *spinidorsalis* in situ on the seafloor. Scale bar is 10 cm. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

b: *Hemipenaeus* cf. *spinidorsalis* swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

c: *Hemipenaeus* cf. *spinidorsalis* swimming above the seafloor. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

d: *Hemipenaeus* cf. *spinidorsalis* in situ on the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

e: *Hemipenaeus* cf. *spinidorsalis* swimming above the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

Genus *Cerataspis* Gray, 1828

Cerataspis cf. *monstrosus* Gray, 1828

Material

- a. scientificName: *Cerataspis monstrosus*; taxonConceptID: *Cerataspis* cf. *monstrosus*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Aristeidae; taxonRank: species; genus: *Cerataspis* ; scientificNameAuthorship: Gray, 1828; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4046; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8661; decimalLongitude: -116.5548; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2013-10-09; eventTime: 12:05; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA01; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Feeding on bait; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Very long abdominal appendages, ability to swim, toothed rostrum, red color, elongate oval antennal scale. One of the largest deep-sea shrimp.

Fig. 14

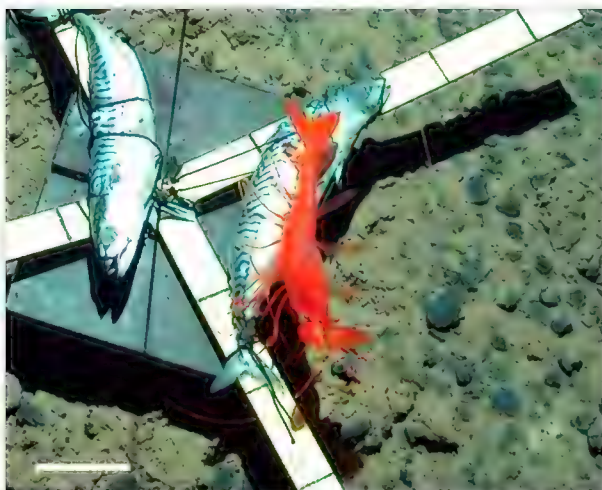


Figure 14. [doi](https://doi.org/10.1038/srep30492)

Cerataspis cf. *monstrosus* in situ feeding on bait on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: A Leitner and J Drazen, University of Hawai'i.

Family Glyphocrangonidae Smith, 1884

Genus *Glyphocrangon* A. Milne-Edwards, 1881

cf. *Glyphocrangon* morphospecies

Material

- a. scientificName: *Glyphocrangon* sp.; taxonConceptID: cf. *Glyphocrangon* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Glyphocrangonidae; taxonRank: genus; genus: *Glyphocrangon*; scientificNameAuthorship: Milne-Edwards, 1881; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4222; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5842; decimalLongitude: -116.7045; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 5:41; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Very large round eyes, stocky body, ridged margins on abdominal somites, short legs. In lateral view, carapace bears strong ridges (carinae).

Fig. 15



Figure 15. [doi](#)

cf. *Glyphocrangon* morphospecies in situ on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Family Munidopsidae Ortmann, 1898

Genus *Munidopsis* Whiteaves, 1874

cf. *Munidopsis* morphospecies

Material

- a. scientificName: *Munidopsis* sp.; taxonConceptID: cf. *Munidopsis* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Munidopsidae; taxonRank: genus; genus: *Munidopsis*; scientificNameAuthorship: Whiteaves, 1874; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 3605; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4353; decimalLongitude: -116.5533; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-09; eventTime: 19:15; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA09; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 16



Figure 16. [doi](https://doi.org/10.1016/j.dsr.2017.04.017)

cf. *Munidopsis* morphospecies with several *Pachycara* cf. *nazca* in situ on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: A Leitner and J Drazen, University of Hawai'i.

Notes: Pale color, no pigment in eyes, short but strong pincers, three pair of walking legs (pereopods) on each side (not four, as would be seen in a true crab, Brachyura). Mouthparts do not cover oral field (as they usually do in true crabs). To identify the species, one would need a dorsal view.

Family Nematocarcinidae Smith, 1884

Genus *Nematocarcinus* A. Milne-Edwards, 1881

cf. *Nematocarcinus* morphospecies

Materials

- a. scientificName: *Nematocarcinus* sp.; taxonConceptID: cf. *Nematocarcinus* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Nematocarcinidae; taxonRank: genus; genus: *Nematocarcinus*; scientificNameAuthorship: Milne-Edwards, 1881; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4032; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8629; decimalLongitude: -116.5485; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:59; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Nematocarcinus* sp.; taxonConceptID: cf. *Nematocarcinus* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Nematocarcinidae; taxonRank: genus; genus: *Nematocarcinus*; scientificNameAuthorship: Milne-Edwards, 1881; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4021; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8583; decimalLongitude: -116.5472; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 2:30; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Mary Wicksten, Jeffrey

Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014;
 identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language:
 en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord:
 HumanObservation

Notes: Enormously long and slender legs and antennae, slender body, toothed rostrum (not visible in dorsal view), abdominal appendages usually not visible in dorsal view.

Fig. 17

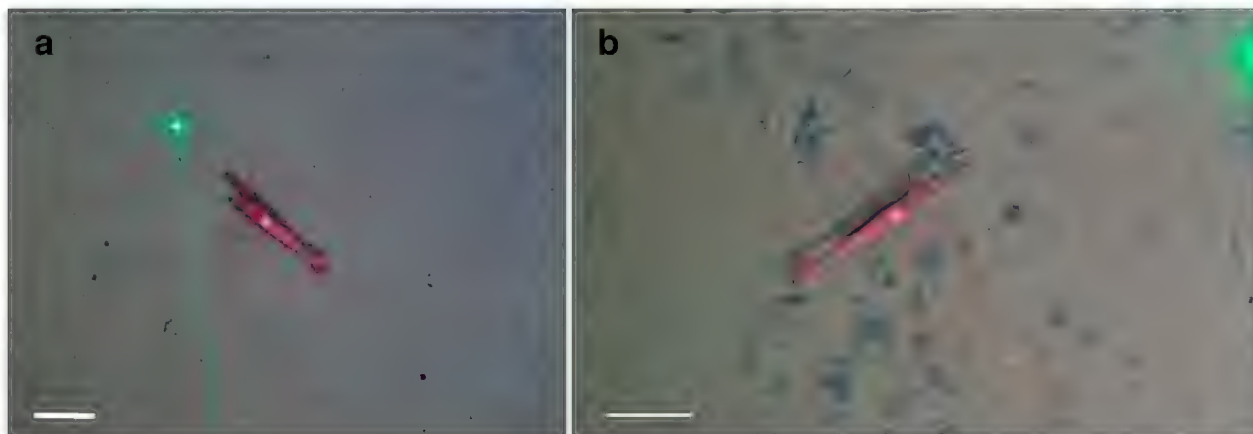


Figure 17.

cf. *Nematocarcinus* morphospecies observed in the UK-1 exploration contract area. Images (a-b) correspond with the relevant data above.

a: cf. *Nematocarcinus* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. *Nematocarcinus* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

Family Solenoceridae Wood-Mason in Wood-Mason & Alcock, 1891

Genus *Hymenopenaeus* Smith, 1882

Hymenopenaeus cf. *nereus* Faxon, 1893

Materials

- a. scientificName: *Hymenopenaeus nereus*; taxonConceptID: *Hymenopenaeus nereus*;
 kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family:
 Solenoceridae; taxonRank: species; genus: *Hymenopenaeus*; scientificNameAuthorship:
 Faxon, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality:
 UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1
 Stratum A; maximumDepthInMeters: 4156; locationRemarks: RV Melville Cruise MV1313;
 decimalLatitude: 13.8885; decimalLongitude: -116.6824; geodeticDatum: WGS84;
 coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Trap; eventDate:
 2013-10-19; eventTime: 4:40; habitat: Abyssal polymetallic-nodule field; fieldNumber:
 TR05; individualCount: 2; lifeStage: Adult; preparations: tissue and DNA voucher stored in
 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4%
 formaldehyde; catalogNumber: AB1-TR05-shrimp-2; recordNumber: AB1-TR05-shrimp-2;

recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present;
 associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2014; identificationRemarks: Identified by morphology of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

- b. scientificName: *Hymenopenaeus nereus*; taxonConceptID: *Hymenopenaeus* cf. *nereus*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Solenoceridae; taxonRank: species; genus: *Hymenopenaeus*; scientificNameAuthorship: Faxon, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4071; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7604; decimalLongitude: -116.4679; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:21; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: *Hymenopenaeus nereus*; taxonConceptID: *Hymenopenaeus* cf. *nereus*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Solenoceridae; taxonRank: species; genus: *Hymenopenaeus*; scientificNameAuthorship: Faxon, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4070; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7604; decimalLongitude: -116.4678; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences

on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- d. scientificName: *Hymenopenaeus nereus*; taxonConceptID: *Hymenopenaeus* cf. *nereus*; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Solenoceridae; taxonRank: species; genus: *Hymenopenaeus*; scientificNameAuthorship: Faxon, 1893; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4267; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5667; decimalLongitude: -116.7082; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-02-21; eventTime: 20:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA02; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Mary Wicksten, Jeffrey Drazen, Astrid Leitner, Diva J. Amon, Amanda Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Short rostrum with few teeth, slender abdomen, very long thread-like legs, second abdominal somite does not overlap first or third somite.

Fig. 18

Family Stylodactylidae Spence Bate, 1888

Genus *Bathystylodactylus* Hanamura & Takeda, 1996

cf. *Bathystylodactylus* morphospecies

Material

- a. scientificName: *Bathystylodactylus* sp.; taxonConceptID: cf. *Bathystylodactylus* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Decapoda; family: Stylodactylidae; taxonRank: genus; genus: *Bathystylodactylus*; scientificNameAuthorship: Hanamura & Takeda, 1996; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3922; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6786; decimalLongitude: -114.4074;

geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:07; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

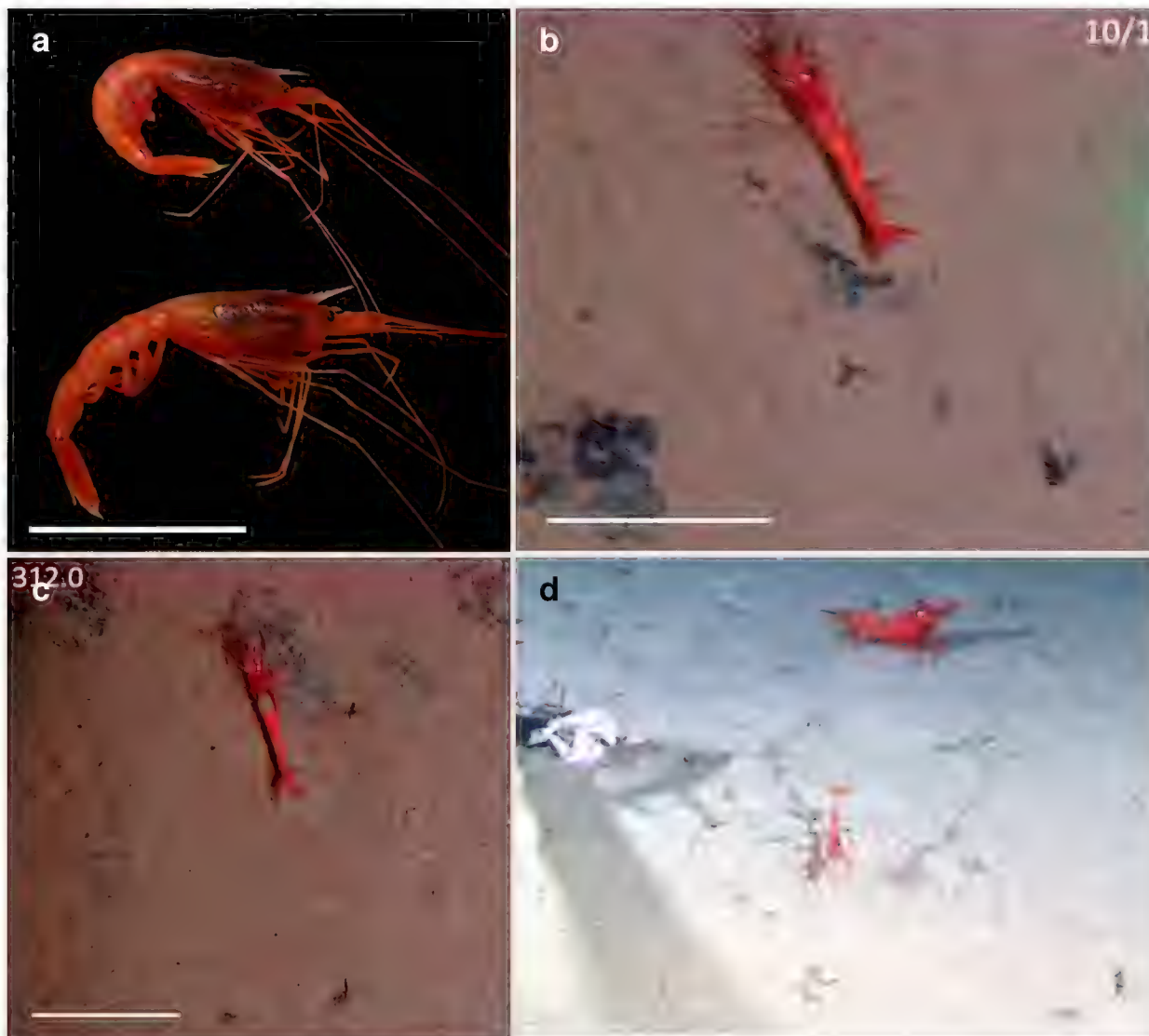


Figure 18.

Hymenopenaeus cf. *nereus* observed in the UK-1 exploration contract area. Images (a-d) correspond with the relevant data above.

a: *Hymenopenaeus nereus* after collection via baited trap from the UK-1 exploration contract area. Scale bar is 10 cm. Image attribution: A Leitner and J Drazen, University of Hawai'i.

[doi](#)

b: *Hymenopenaeus* cf. *nereus* in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon and CR Smith, University of Hawai'i. [doi](#)

c: *Hymenopenaeus* cf. *nereus* in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon and CR Smith, University of Hawai'i. [doi](#)

d: *Hymenopenaeus* cf. *nereus* in situ on the seafloor (centre of image) with an aristeid shrimp (nearest to top of image). Image attribution: A Leitner and J Drazen, University of Hawai'i.

[doi](#)

Notes: Elongate setose legs and rostrum, abdominal appendages do not protrude laterally, shrimp is pale pink, not red, posture is with front of body angled slightly upward from sediment surface.

Fig. 19



Figure 19. [doi](#)

cf. *Bathystylodactylus* morphospecies in situ on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Order Isopoda Latreille, 1817

Family Munnopsidae Lilljeborg, 1864

cf. *Munnopsidae* morphospecies

Materials

- a. scientificName: *Munnopsidae* sp.; taxonConceptID: cf. *Munnopsidae* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Isopoda; family: Munnopsidae; taxonRank: family; scientificNameAuthorship: Lilljeborg, 1864; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4070; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7603; decimalLongitude: -116.4678; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:57; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On a sponge; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- b. scientificName: *Munnopsidae* sp.; taxonConceptID: cf. *Munnopsidae* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Malacostraca; order: Isopoda; family: Munnopsidae; taxonRank: family; scientificNameAuthorship: Lilljeborg, 1864; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4110; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8500; decimalLongitude: -116.6456; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 11:27; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 20



Figure 20.

cf. *Munnopsidae* morphospecies observed in the UK-1 exploration contract area. Images (a-b) correspond with the data in (a) above, whereas image (c) corresponds with the data in (b) above.

a: Front view of cf. *Munnopsidae* morphospecies in situ on a sponge. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: Dorsal view of cf. *Munnopsidae* morphospecies in situ on a sponge. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: cf. *Munnopsidae* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

Notes: Like amphipods, isopods lack a carapace and have eyes set into the head. Very long spider-like legs and compact body. Distinguished from true sea spiders (Pycnogonida), which have a long anterior proboscis and a segmented slender body.

Class Hexanauplia Oakley, Wolfe, Lindgren & Zaharof, 2013

Order Scalpelliformes Buckeridge & Newman, 2006

Family Scalpellidae Pilsbry, 1907

Genus *Neoscalpellum* Pilsbry, 1907

cf. *Neoscalpellum* morphospecies

Material

- a. scientificName: *Neoscalpellum* sp.; taxonConceptID: cf. *Neoscalpellum* morphospecies; kingdom: Animalia; phylum: Arthropoda; class: Hexanauplia; order: Scalpelliformes; family: Scalpellidae; taxonRank: genus; genus: *Neoscalpellum*; scientificNameAuthorship: Pilsbry, 1907; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4025; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8646; decimalLongitude: -116.5481; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 6:10; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Mary Wicksten, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Ovate upper area (the capitulum) and large uncalcified areas between plates.

Fig. 21



Figure 21. [doi](#)

cf. *Neoscalpellum* morphospecies attached to a polymetallic nodule on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Bryozoans of the UKSRL exploration contract area (UK-1) and the eastern Clarion-Clipperton Zone

Phylum Bryozoa Ehrenberg, 1831

Class Gymnolaemata Allman, 1856

Order Cheilostomatida Busk, 1852

Superfamily Bifaxarioidea Busk, 1884

Family Bifaxariidae Busk, 1884

Genus *Smithsonius* Gordon, 1988

cf. *Smithsonius* morphospecies

Materials

- a. scientificName: *Smithsonius* sp.; taxonConceptID: cf. *Smithsonius* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Bifaxariidae; taxonRank: genus; genus: *Smithsonius*; scientificNameAuthorship: Gordon, 1988; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4024; locationRemarks: RV Melville Cruise MV1313;

decimalLatitude: 13.8646; decimalLongitude: -116.5481; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 8:24; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- b. scientificName: *Smithsonius* sp.; taxonConceptID: cf. *Smithsonius* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Bifaxariidae; taxonRank: genus; genus: *Smithsonius*; scientificNameAuthorship: Gordon, 1988; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4119; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8498; decimalLongitude: -116.6457; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 12:39; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: *Smithsonius* sp.; taxonConceptID: cf. *Smithsonius* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Bifaxariidae; taxonRank: genus; genus: *Smithsonius*; scientificNameAuthorship: Gordon, 1988; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3944; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4126; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 10:10; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- d. scientificName: *Smithsonius* sp.; taxonConceptID: cf. *Smithsonius* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Bifaxariidae; taxonRank: genus; genus: *Smithsonius*; scientificNameAuthorship: Gordon, 1988; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3953; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6797; decimalLongitude: -114.4146; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 13:21; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy:

Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014;
identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language:
en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord:
HumanObservation

Notes: Fixed-erect colonies with solid bifurcating branches possessing alternately arranged zooids facing in the opposite directions.

Fig. 22

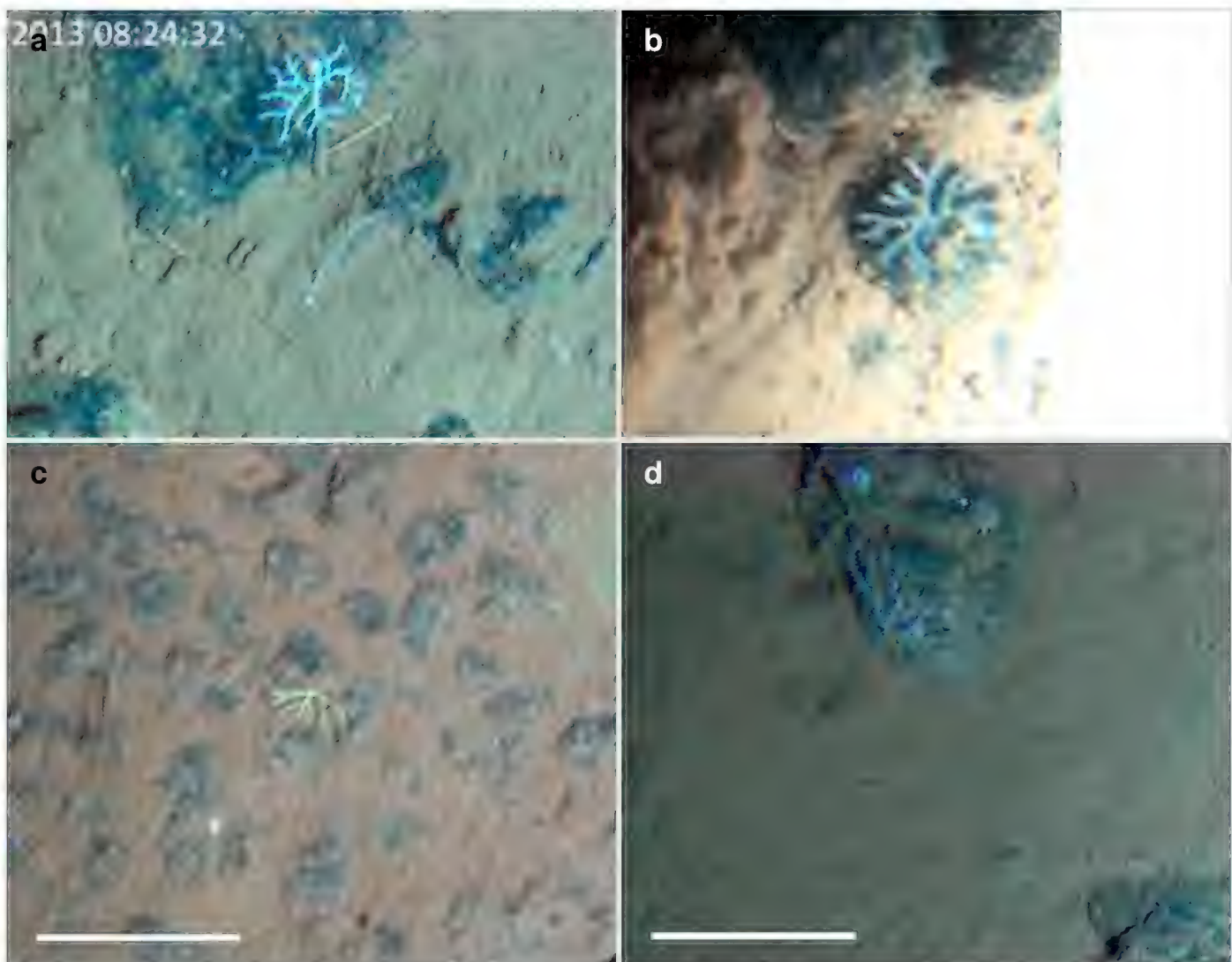


Figure 22.

cf. *Smithsonius* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Images (a-d) correspond with the relevant data above.

a: cf. *Smithsonius* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. *Smithsonius* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: cf. *Smithsonius* morphospecies attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

d: cf. *Smithsonius* morphospecies attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

Superfamily Buguloidea Gray, 1848

Family Candidae d'Orbigny, 1851

Genus *Notoplites* Harmer, 1923

cf. *Notoplites* morphospecies

Materials

- a. scientificName: *Notoplites* sp.; taxonConceptID: cf. *Notoplites* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Candidae; taxonRank: genus; genus: *Notoplites*; scientificNameAuthorship: Harmer, 1923; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4110; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8484; decimalLongitude: -116.6567; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 11:10; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Notoplites* sp.; taxonConceptID: cf. *Notoplites* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Candidae; taxonRank: genus; genus: *Notoplites*; scientificNameAuthorship: Harmer, 1923; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3914; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6793; decimalLongitude: -114.4072; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:52; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: *Notoplites* sp.; taxonConceptID: cf. *Notoplites* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Candidae; taxonRank: genus; genus: *Notoplites*; scientificNameAuthorship: Harmer, 1923; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4110; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8502; decimalLongitude: -116.6457; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 12:05; habitat: Abyssal polymetallic-nodule field;

fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

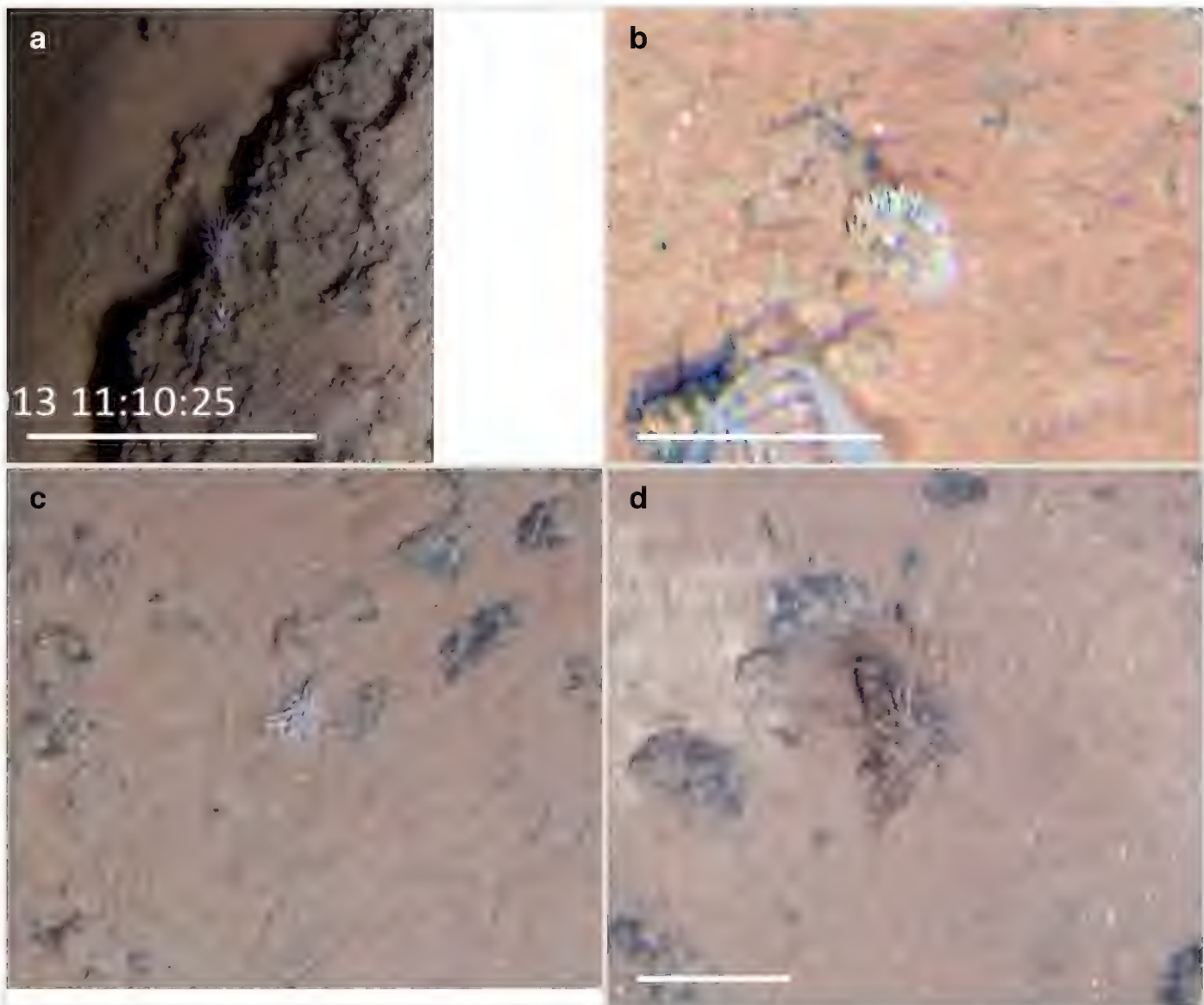


Figure 23.

cf. *Notoplites* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Images (a-d) correspond with the relevant data above.

a: cf. *Notoplites* morphospecies (the branching delicate colony in the centre of image) attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. *Notoplites* morphospecies attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: cf. *Notoplites* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

d: cf. *Notoplites* morphospecies attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

- d. scientificName: *Notoplites* sp.; taxonConceptID: cf. *Notoplites* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Candidae; taxonRank: genus; genus: *Notoplites*; scientificNameAuthorship: Harmer,

1923; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4026; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8647; decimalLongitude: -116.5482; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 5:34; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Rooted arborescent colonies with delicate bifurcating branches interconnected by transverse parallel series of chitinous tubes (fibers).

Fig. 23

Superfamily Calloporoidea Norman, 1903

Family Farciminariidae Busk, 1852

Genus *Columnella* Levinsen, 1914

cf. *Columnella* morphospecies

Material

- a. scientificName: *Columnella* sp.; taxonConceptID: cf. *Columnella* morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; family: Farciminariidae; taxonRank: genus; genus: *Columnella*; scientificNameAuthorship: Levinsen, 1914; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4110; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8500; decimalLongitude: -116.6456; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 13:17; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Rooted arborescent, lightly calcified colony with slender, bifurcating branches.

Fig. 24



Figure 24. [doi](#)

cf. *Columnella* morphospecies attached to a polymetallic nodule on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Superfamily Lepralielloidea Vigneaux, 1949

cf. Lepralielloidea morphospecies

Material

- a. scientificName: Lepralielloidea sp.; taxonConceptID: cf. Lepralielloidea morphospecies; kingdom: Animalia; phylum: Bryozoa; class: Gymnolaemata; order: Cheilostomatida; taxonRank: superfamily; scientificNameAuthorship: Vigneaux, 1949; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4110; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8484; decimalLongitude: -116.6567; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 11:10; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Andrei Grischenko, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Fixed-erect colony with relatively short stem followed by four solid dichotomous branches.

Fig. 25



Figure 25. [doi](#)

cf. *Lepralielloidea* morphospecies (small white colony nearest to bottom of the image) attached to a polymetallic nodule on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Chordates of the UKSRL exploration contract area (UK-1) and the eastern Clarion-Clipperton Zone

Phylum Chordata Haeckel, 1874

Class Ascidiacea Blainville, 1824

Order Phlebobranchia Lahille, 1886

cf. *Phlebobranchia* morphospecies 1

Material

- a. scientificName: *Phlebobranchia* sp.; taxonConceptID: cf. *Phlebobranchia* morphospecies 1; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; taxonRank: order; scientificNameAuthorship: Lahille, 1886; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4033; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8636; decimalLongitude: -116.5486; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 5:10; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. *Scientific Reports*. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Craig Young, Diva J.

Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Elongate phlebobranch ascidian. A branching transparent stolon to the left of the ascidian may be part of the individual, but this is not certain.

Fig. 26

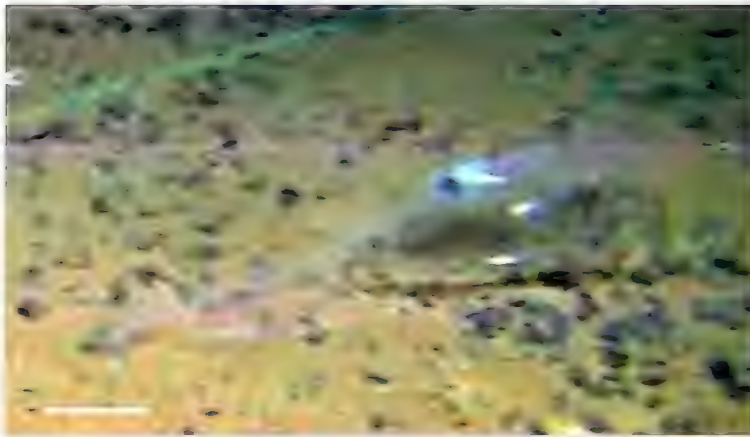


Figure 26. [doi](#)

cf. Phlebobranchia morphospecies 1 attached to a polymetallic nodule on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

cf. Phlebobranchia morphospecies 2

Material

- a. scientificName: Phlebobranchia sp.; taxonConceptID: cf. Phlebobranchia morphospecies 2; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; taxonRank: order; scientificNameAuthorship: Lahille, 1886; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4101; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8518; decimalLongitude: -116.6448; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 16:57; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Very transparent ascidian approximately twice as long as it is wide. Larger incurrent siphon points anteriorly. Smaller atrial siphon points to the side. Rows of bright white spots are probably not part of the ascidian.

Fig. 27



Figure 27. [doi](#)

cf. Phlebobranchia morphospecies 2 attached to a polymetallic nodule on the seafloor in the UK-1 exploration contract area. It is attached to another organism that resembles a narrow stalk. Image corresponds with the data above. Image attribution: DJ Amon & CR Smith, University of Hawai'i.

Family Octacnemidae Herdman, 1888

Genus *Dicopia* Sluiter, 1905

cf. *Dicopia* morphospecies

Materials

- a. scientificName: *Dicopia* sp.; taxonConceptID: cf. *Dicopia* morphospecies; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; family: Octacnemidae; taxonRank: genus; genus: *Dicopia*; scientificNameAuthorship: Sluiter, 1905; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3927; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6789; decimalLongitude: -114.4093; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 10:47; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Dicopia* sp.; taxonConceptID: cf. *Dicopia* morphospecies; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; family: Octacnemidae; taxonRank: genus; genus: *Dicopia*; scientificNameAuthorship: Sluiter, 1905; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4063; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9666; decimalLongitude: -116.5573; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle;

eventDate: 2013-10-15; eventTime: 23:58; habitat: Abyssal polymetallic-nodule field;
fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged
only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler;
occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler;
dateIdentified: 2014; identificationRemarks: Identified only from imagery;
identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName:
ABYSSLINE; basisOfRecord: HumanObservation

Notes: Attached to polymetallic nodules by a short, thick stalk of transparent tunic. Expansive incurrent siphon appears as a smiling mouth on the side of the animal. Large incurrent (atrial) siphon on top appears as a transparent region when open. Nearly circular in shape when viewed from above.

Fig. 28

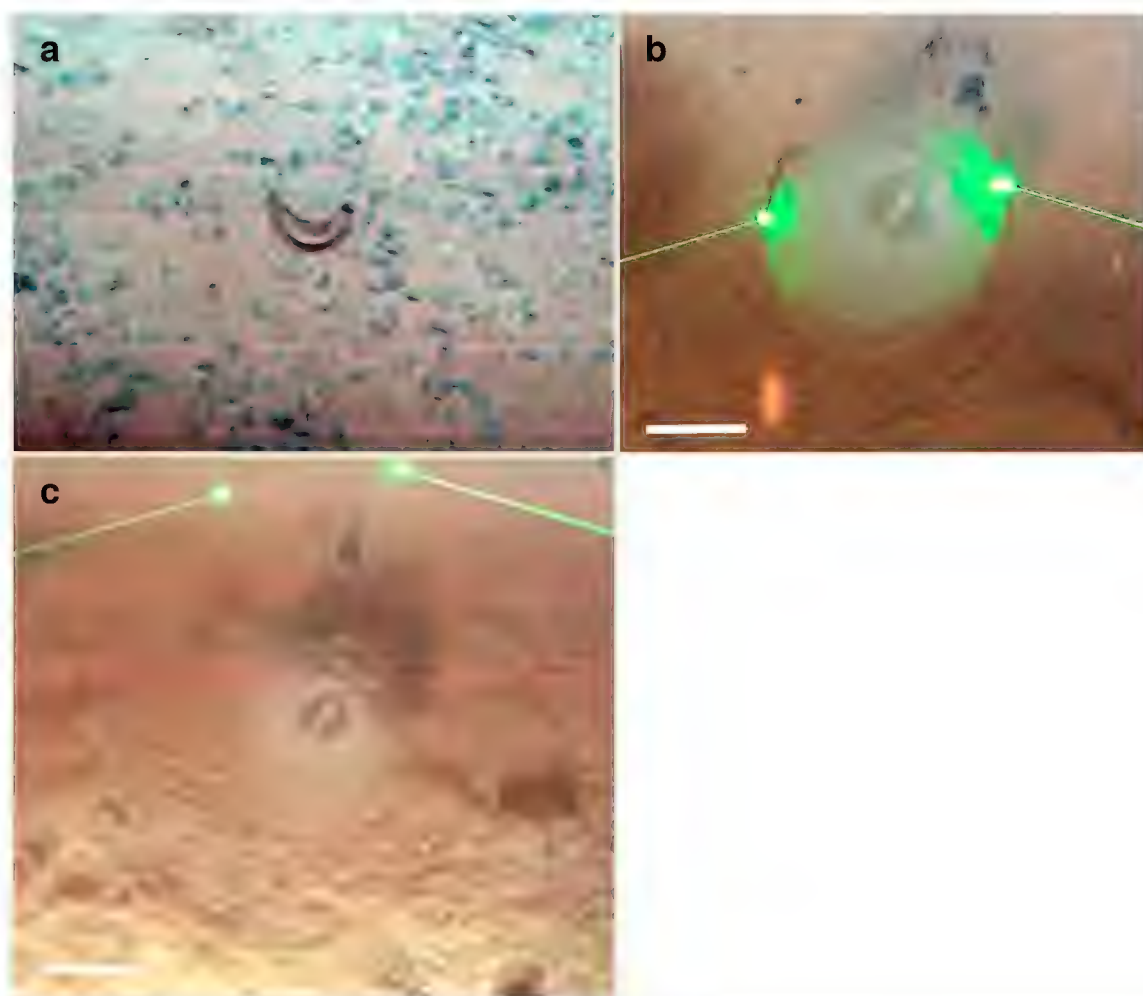


Figure 28.

cf. *Dicopia* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Image (a) corresponds with the data in (a) above whereas images (b-c) correspond with the data above in (b).

a: cf. *Dicopia* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. *Dicopia* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: cf. *Dicopia* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

Genus *Megalodicopia* Oka, 1918

cf. *Megalodicopia* morphospecies

Materials

- a. scientificName: *Megalodicopia* sp.; taxonConceptID: cf. *Megalodicopia* morphospecies; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; family: Octacnemidae; taxonRank: genus; genus: *Megalodicopia*; scientificNameAuthorship: Oka, 1918; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3920; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6787; decimalLongitude: -114.4072; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 11:09; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Megalodicopia* sp.; taxonConceptID: cf. *Megalodicopia* morphospecies; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; family: Octacnemidae; taxonRank: genus; genus: *Megalodicopia*; scientificNameAuthorship: Oka, 1918; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4242; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 12.4970; decimalLongitude: -116.6372; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 9:40; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Round transparent ascidian on a thick stalk of tunic that stands higher off the bottom than *Dicopia*. Excurrent siphon is also much smaller than that of *Dicopia*.

Fig. 29

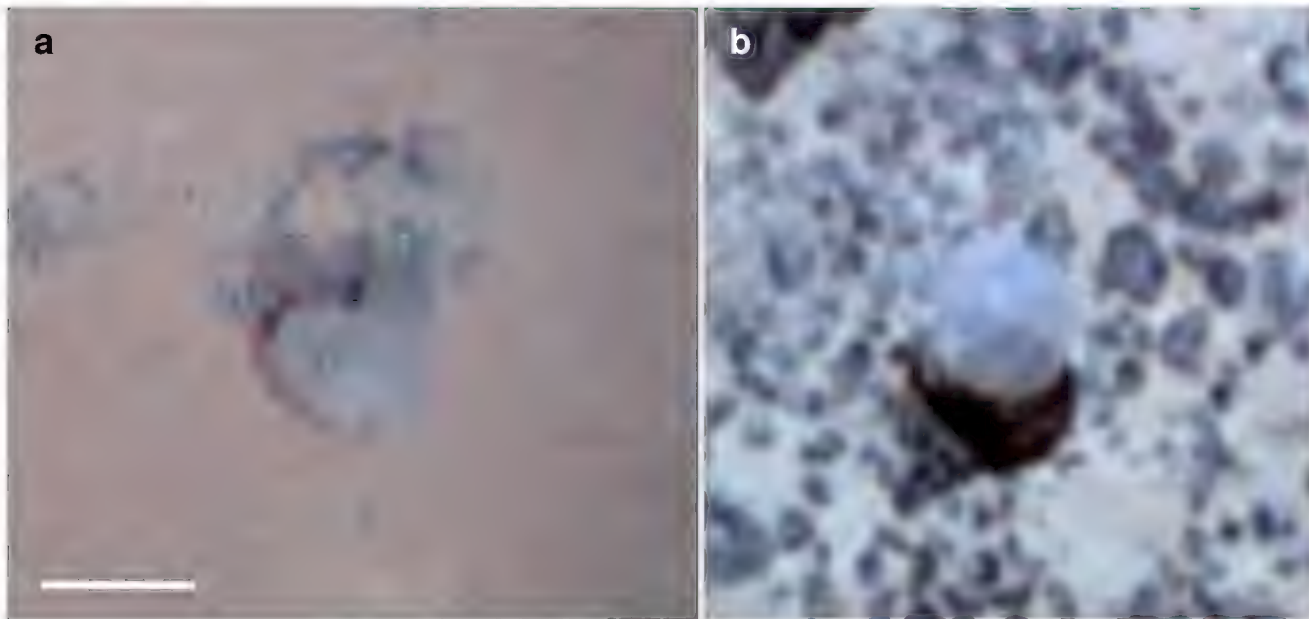


Figure 29.

cf. *Megalodicopia* morphospecies observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the relevant data above.

a: cf. *Megalodicopia* morphospecies attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. *Megalodicopia* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

Genus *Situla* Vinogradova, 1969

cf. *Situla* morphospecies

Materials

- a. scientificName: *Situla* sp.; taxonConceptID: cf. *Situla* morphospecies; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; family: Octacnemidae; taxonRank: genus; genus: *Situla*; scientificNameAuthorship: Vinogradova, 1969; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4057; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9671; decimalLongitude: -116.5587; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 0:14; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Situla* sp.; taxonConceptID: cf. *Situla* morphospecies; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; family: Octacnemidae; taxonRank: genus; genus: *Situla*; scientificNameAuthorship: Vinogradova, 1969; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B;

maximumDepthInMeters: 4215; locationRemarks: RV Melville Cruise MV1313;
 decimalLatitude: 12.5896; decimalLongitude: -116.7089; geodeticDatum: WGS84;
 coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle;
 eventDate: 2015-03-09; eventTime: 14:31; habitat: Abyssal polymetallic-nodule field;
 fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged
 only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler;
 occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler;
 dateIdentified: 2015; identificationRemarks: Identified only from imagery;
 identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName:
 ABYSSLINE; basisOfRecord: HumanObservation

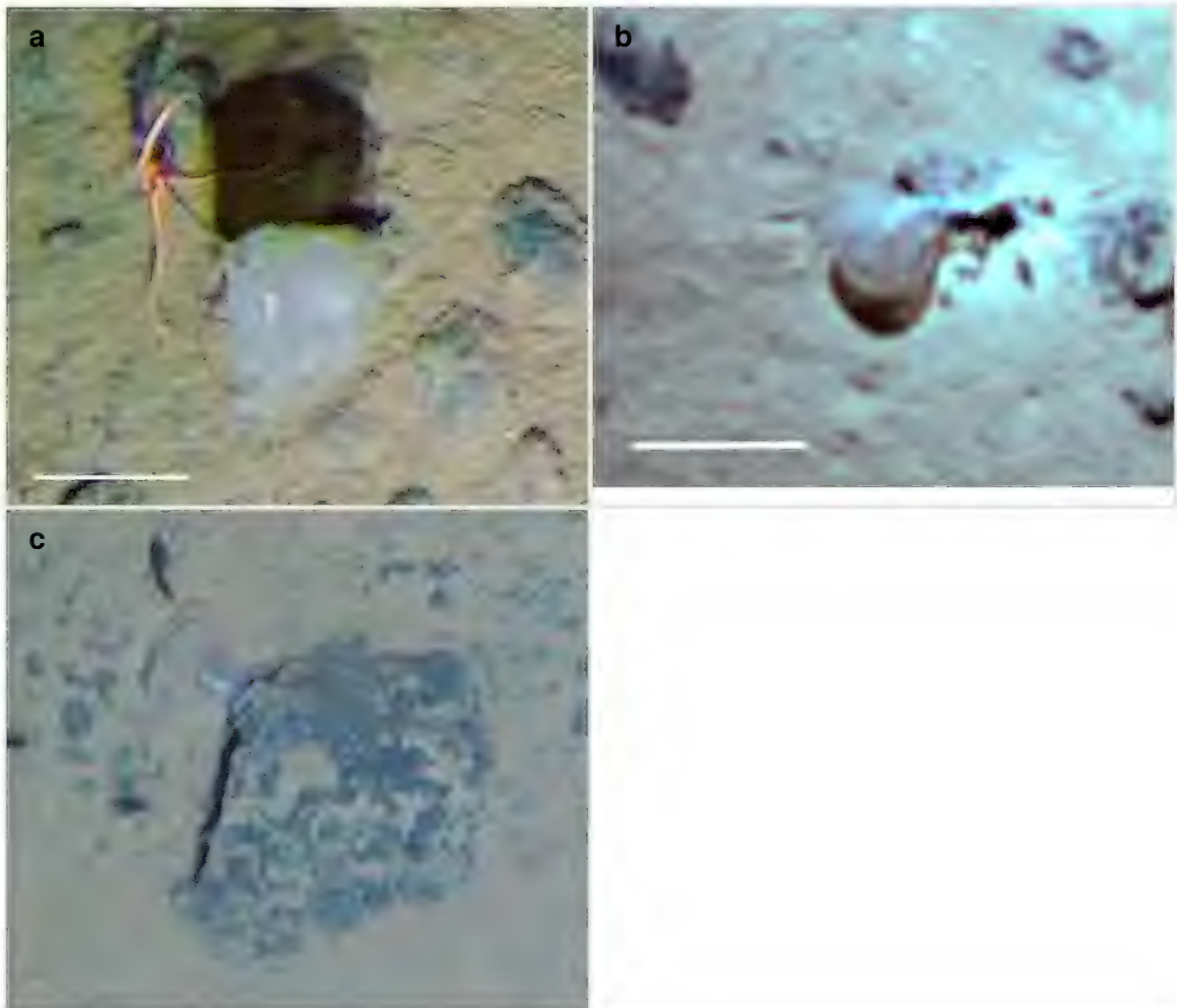


Figure 30.

cf. *Situla* morphospecies observed in the UK-1 exploration contract area. Images (a-c) correspond with the relevant data above.

a: cf. *Situla* morphospecies attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. *Situla* morphospecies attached to a polymetallic nodule on the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

c: cf. *Situla* morphospecies attached to a polymetallic nodule on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

- c. scientificName: *Situla* sp.; taxonConceptID: cf. *Situla* morphospecies; kingdom: Animalia; phylum: Chordata; class: Ascidiacea; order: Phlebobranchia; family: Octacnemidae; taxonRank: genus; genus: *Situla*; scientificNameAuthorship: Vinogradova, 1969; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4097; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8527; decimalLongitude: -116.6444; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-10; eventTime: 17:05; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (RV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On nodule; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Craig Young, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Large transparent ascidian most often attached to the side of a rock by means of a short but stout tunic stalk. In contrast to *Dicopia* or *Megadicopia*, this species is somewhat elongated laterally. The excurrent siphon is smaller in diameter than that of *Dicopia*.

Fig. 30

Class Actinopterygii

cf. Actinopterygii morphospecies

Material

- a. scientificName: Actinopterygii sp.; taxonConceptID: cf. Actinopterygii morphospecies; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; taxonRank: class; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4223; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5887; decimalLongitude: -116.7169; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 8:30; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Rounded head with large rounded pectoral fins tapering to a thin tail.

Fig. 31



Figure 31. [doi](#)

cf. *Actinopterygii* morphospecies observed swimming above the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Order Anguilliformes

Family Synphobranchidae Johnson, 1862

Genus *Histiobranchus* Gill, 1883

Histiobranchus cf. *bathybius* Günther, 1877

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as “Synphobranchidae morphotype”.

Materials

- a. scientificName: *Histiobranchus bathybius*; taxonConceptID: *Histiobranchus* cf. *bathybius*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Anguilliformes; family: Synphobranchidae; taxonRank: species; genus: *Histiobranchus*; scientificNameAuthorship: Günther, 1877; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4249; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5035; decimalLongitude: -116.6441; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-04; eventTime: 7:58; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from

imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

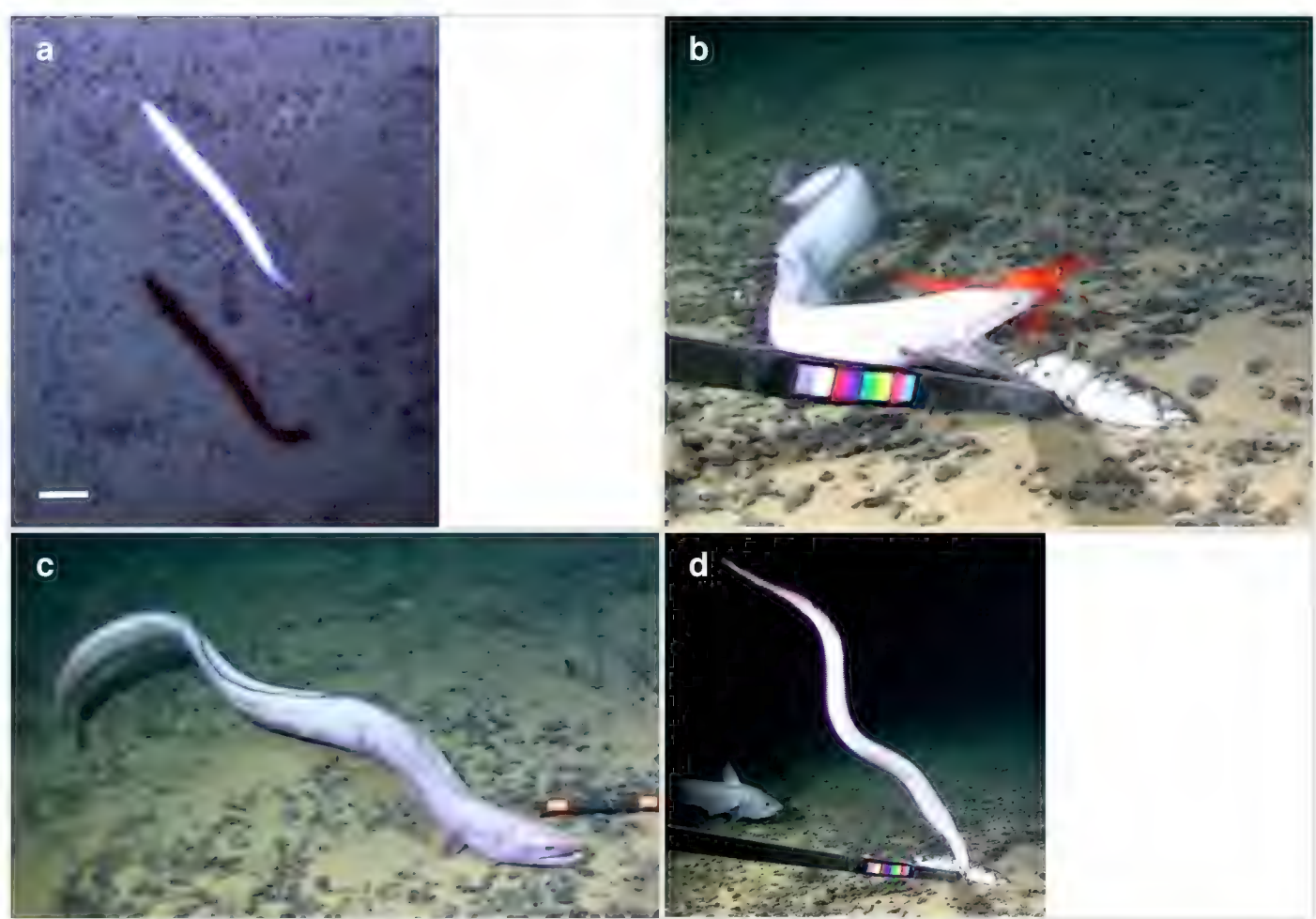


Figure 32.

Histiobranchus cf. *bathybius* observed in the UK-1 exploration contract area. Image (a) corresponds with the data in (a) above, whereas images (b-d) correspond with the data in (b) above.

a: *Histiobranchus* cf. *bathybius* swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: *Histiobranchus* cf. *bathybius* in situ feeding on bait on the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

c: *Histiobranchus* cf. *bathybius* feeding on bait on the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

d: *Histiobranchus* cf. *bathybius* (foreground) feeding on bait on the seafloor with a cf. *Coryphaenoides* morphospecies (background). Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

- b. scientificName: *Histiobranchus bathybius*; taxonConceptID: *Histiobranchus* cf. *bathybius*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Anguilliformes; family: Synphobranchidae; taxonRank: species; genus: *Histiobranchus*; scientificNameAuthorship: Günther, 1877; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4263; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4526; decimalLongitude: -116.6488; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-07; eventTime: 17:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA08; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Feeding on bait; recordedBy: Jeffrey Drazen, Astrid

Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Elongated eel-like body with small pectoral fins and large jaws extending well past eye. Dorsal fin insertion before anus. Generally white to grey. No prominent lateral line pores. Notch near the end of the anal fin.

Fig. 32

Order Aulopiformes

Family Bathysauridae Fowler, 1944

Genus *Bathysaurus* Günther, 1878

Bathysaurus cf. *mollis* Günther, 1878

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as “*Bathysaurus mollis*”.

Materials

- a. scientificName: *Bathysaurus mollis*; taxonConceptID: *Bathysaurus* cf. *mollis*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Aulopiformes; family: Bathysauridae; taxonRank: species; genus: *Bathysaurus*; scientificNameAuthorship: Gunther, 1878; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4028; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8618; decimalLongitude: -116.5484; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:45; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language:

en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- b. scientificName: *Bathysaurus mollis*; taxonConceptID: *Bathysaurus* cf. *mollis*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Aulopiformes; family: Bathysauridae; taxonRank: species; genus: *Bathysaurus*; scientificNameAuthorship: Gunther, 1878; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4226; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5787; decimalLongitude: -116.7246; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 6:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 33

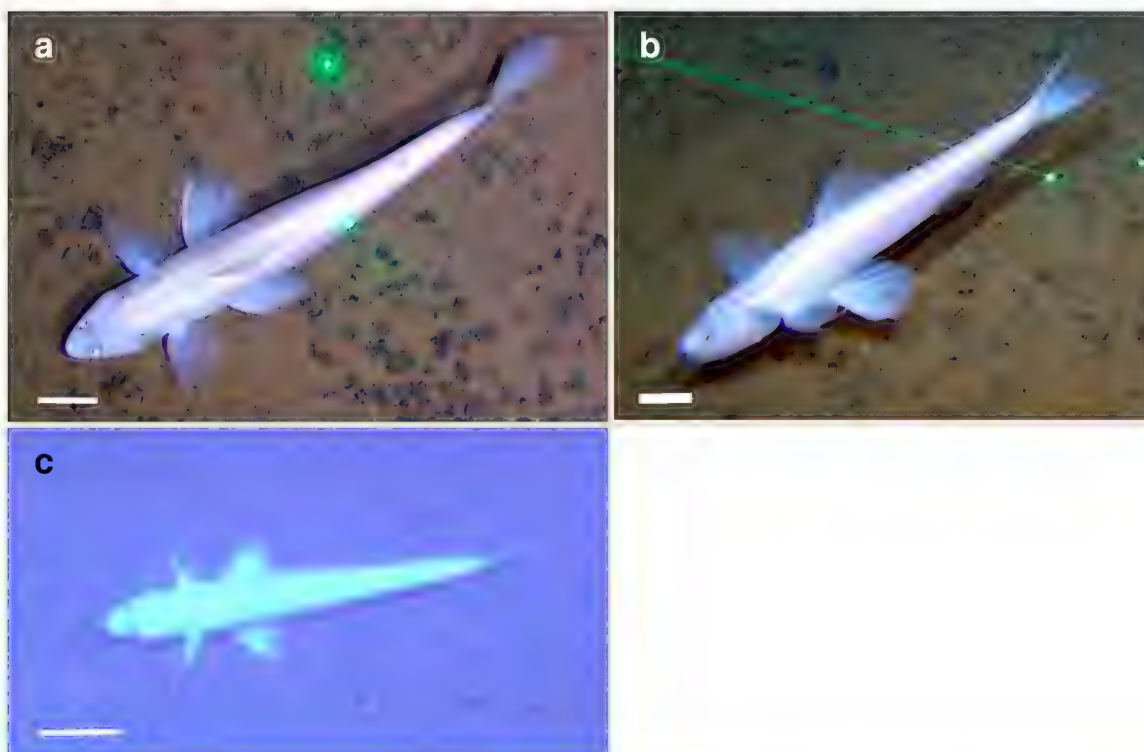


Figure 33.

Bathysaurus cf. *mollis* observed in the UK-1 exploration contract area. Images (a-b) correspond with the data in (a) above, whereas image (c) corresponds with the data in (b).

a: Dorsal view of *Bathysaurus* cf. *mollis* swimming above the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: Side view of *Bathysaurus* cf. *mollis* swimming above the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: *Bathysaurus* cf. *mollis* in situ on the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

Notes: White to grey/silvery body with flattened, depressed head and gold to green, round reflective eyes. Large mouth with jaw extending past eye and prominent teeth. Typical posture is perched on substrate with all fins extended.

Family Ipnopidae Gill, 1884

Genus *Ipnops* Günther, 1878

Ipnops cf. *meadi* Nielsen, 1966

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as “*Ipnops* morphotype”.

Materials

- a. scientificName: *Ipnops meadi*; taxonConceptID: *Ipnops* cf. *meadi*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Aulopiformes; family: Ipnopidae; taxonRank: species; genus: *Ipnops*; scientificNameAuthorship: Nielsen, 1966; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4028; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8637; decimalLongitude: -116.5462; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 1:09; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Ipnops meadi*; taxonConceptID: *Ipnops* cf. *meadi*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Aulopiformes; family: Ipnopidae; taxonRank: species; genus: *Ipnops*; scientificNameAuthorship: Nielsen, 1966; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4027; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8605; decimalLongitude: -116.5483; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 4:29; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG,

Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. *Scientific Reports*. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Thin slender, black body with large, bright, reflective, plate-like eyes and large mouth.

Fig. 34

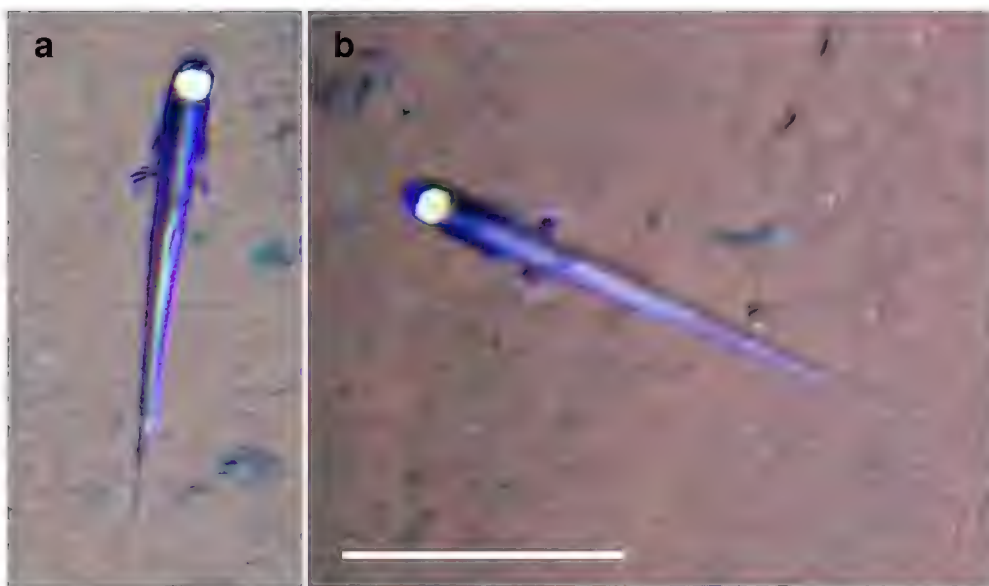


Figure 34.

Ipnops cf. *meadi* observed in the UK-1 exploration contract area. Images (a-b) correspond with the relevant data above.

a: *Ipnops* cf. *meadi* in situ on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: *Ipnops* cf. *meadi* in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

Order Gadiformes

Family Macrouridae Bonaparte, 1831

Genus *Coryphaenoides* Gunnerus, 1765

cf. *Coryphaenoides* morphospecies

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as "*Coryphaenoides* morphotype".

Materials

- a. scientificName: *Coryphaenoides* sp.; taxonConceptID: cf. *Coryphaenoides* morphospecies; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Gadiformes; family: Macrouridae; taxonRank: genus; genus: *Coryphaenoides*; scientificNameAuthorship: Gunnerus, 1765; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4064; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9628; decimalLongitude: -116.5510; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-16; eventTime: 5:15; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 3 (RV03); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Coryphaenoides* sp.; taxonConceptID: cf. *Coryphaenoides* morphospecies; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Gadiformes; family: Macrouridae; taxonRank: genus; genus: *Coryphaenoides*; scientificNameAuthorship: Gunnerus, 1765; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4221; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5877; decimalLongitude: -116.7179; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 8:31; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: *Coryphaenoides yaquinae*; taxonConceptID: *Coryphaenoides yaquinae*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Gadiformes; family: Macrouridae; taxonRank: species; genus: *Coryphaenoides*; scientificNameAuthorship:

Iwamoto & Stein, 1974; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4156; locationRemarks: R/V Melville Cruise MV1313; decimalLatitude: 13.8885; decimalLongitude: -116.6824; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Trap; eventDate: 2013-10-19; eventTime: 4:40; habitat: Abyssal polymetallic-nodule field; fieldNumber: TR05; individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; catalogNumber: AB1-TR05-fish-1; recordNumber: AB1-TR05-fish-1; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified by morphology and DNA of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

- d. scientificName: *Coryphaenoides armatus*; taxonConceptID: *Coryphaenoides armatus*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Gadiformes; family: Macrouridae; taxonRank: species; genus: *Coryphaenoides*; scientificNameAuthorship: Hector, 1875; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4152; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4435; decimalLongitude: -116.2074; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Trap; eventDate: 2015-03-07; eventTime: 17:28; habitat: Abyssal polymetallic-nodule field; fieldNumber: TR08; individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; catalogNumber: AB02-TR08-JD-61; recordNumber: AB02-TR08-JD-61; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified by morphology and DNA of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: PreservedSpecimen

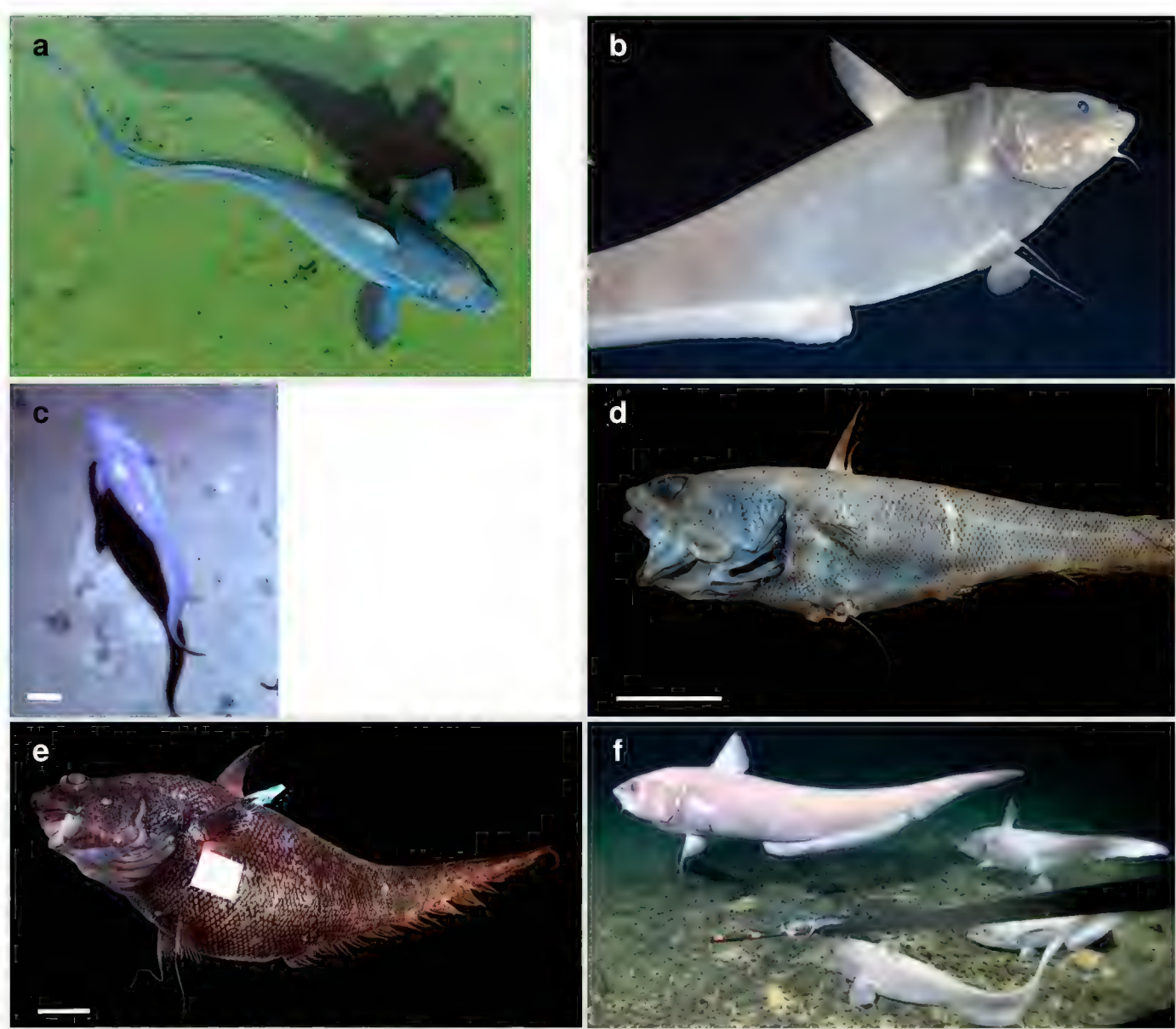


Figure 35.

cf. *Coryphaenoides* morphospecies observed in the UK-1 exploration contract area. There may be two species, *Coryphaenoides armatus* and *Coryphaenoides yaquinae*, in the in situ images, however specimens are required for identification. Images (a-b) correspond with the data in (a) above, whereas image (c-f) correspond with the data in (b-e) above.

a: Dorsal view of cf. *Coryphaenoides* morphospecies swimming above the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: Side view of cf. *Coryphaenoides* morphospecies swimming above the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: cf. *Coryphaenoides* morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

d: *Coryphaenoides yaquinae* after collection via baited trap from the UK-1 exploration contract area. Scale bar is 10 cm. Image attribution: A Leitner and J Drazen, University of Hawai'i. [doi](#)

e: *Coryphaenoides armatus* after collection via baited trap from the UK-1 exploration contract area. Scale bar is 10 cm. Image attribution: A Leitner and J Drazen, University of Hawai'i. [doi](#)

f: Four cf. *Coryphaenoides* morphospecies swimming above the seafloor. Image attribution: A Leitner and J Drazen, University of Hawai'i. [doi](#)

e. scientificName: *Coryphaenoides* sp.; taxonConceptID: cf. *Coryphaenoides*
morphospecies; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order:

Gadiformes; family: Macrouridae; taxonRank: genus; genus: *Coryphaenoides*; scientificNameAuthorship: Gunnerus, 1765; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4275; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5127; decimalLongitude: -116.6219; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-03; eventTime: 21:13; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA06; individualCount: 4; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Includes both species *C. armatus* and *C. yaquinae*. Both species have been recovered from the CCZ but are not readily distinguishable in photographs. Prominent snout and small chin barbel. First dorsal fin prominent and separated from the second dorsal fin which tapers to tip of whip tail. First pelvic fin ray elongated. Body color ranges from white to dark gray often with darker areas around fin insertions and eyes.

Fig. 35

Order Notacanthiformes

Family Halosauridae Günther, 1868

cf. Halosauridae morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as “Halosaur morphotype”.

Materials

- a. scientificName: Halosauridae sp.; taxonConceptID: cf. Halosauridae morphospecies; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Notacanthiformes; family: Halosauridae; taxonRank: family; scientificNameAuthorship: Günther, 1868; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4224; locationRemarks: RV Thompson Cruise TN319;

decimalLatitude: 12.5850; decimalLongitude: -116.7021; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 5:38; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- b. scientificName: Halosauridae sp.; taxonConceptID: cf. Halosauridae morphospecies; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Notacanthiformes; family: Halosauridae; taxonRank: family; scientificNameAuthorship: Günther, 1868; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4213; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5823; decimalLongitude: -116.7109; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 14:41; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 36

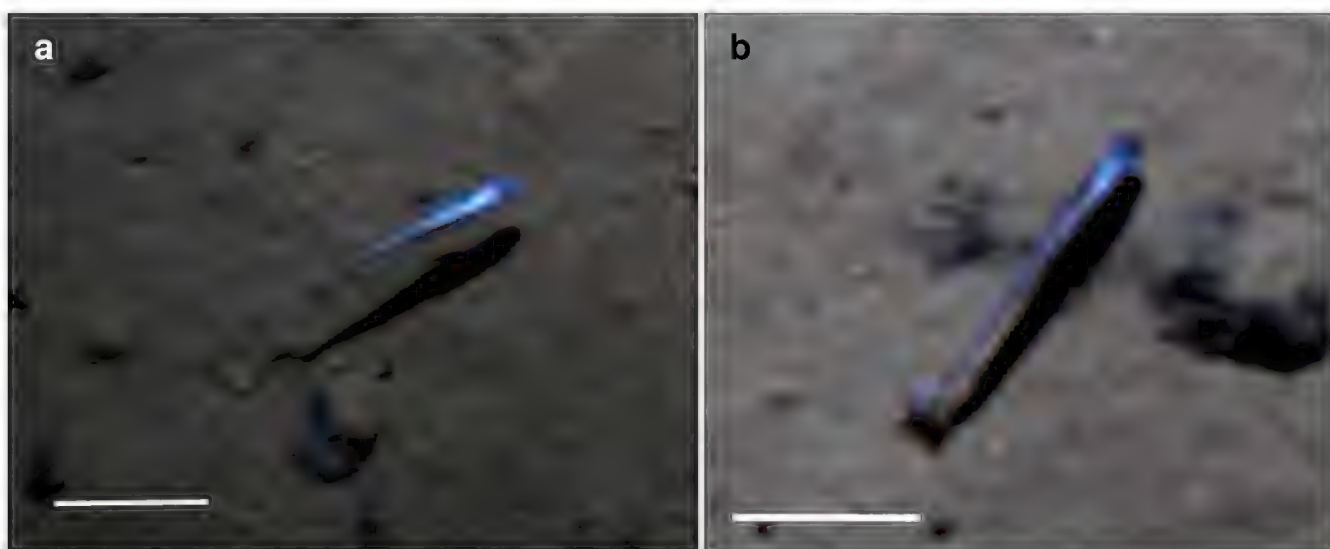


Figure 36.

cf. Halosauridae morphospecies observed in the UK-1 exploration contract area. Images (a-b) correspond with the relevant data above.

a: cf. Halosauridae morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: cf. Halosauridae morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

Notes: Very slender, long body with slender, pointed head. Long whip-like tail. Head often slightly darker than rest of body. Colors range from white to blue/grey.

Distinguishable by swimming pattern: majority of slender body nearly completely straight with propulsion driven by flexion of terminal $\frac{1}{4}$ to $\frac{1}{2}$ of body.

Order Ophidiiformes

Family Ophidiidae Rafinesque, 1810

cf. Ophidiidae morphospecies 1

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as "Ophidiidae morphotype 1".

Materials

- a. scientificName: Ophidiidae sp.; taxonConceptID: cf. Ophidiidae morphospecies 1; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4234; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5389; decimalLongitude: -116.6055; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 15:51; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: Ophidiidae sp.; taxonConceptID: cf. Ophidiidae morphospecies 1; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4026; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.8643; decimalLongitude: -116.5486; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-21; eventTime: 5:18; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (RV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-

Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: A single dorsal fin begins in line with the pectoral fins and continues full length of body. Angular, near rectangular snout.

Fig. 37

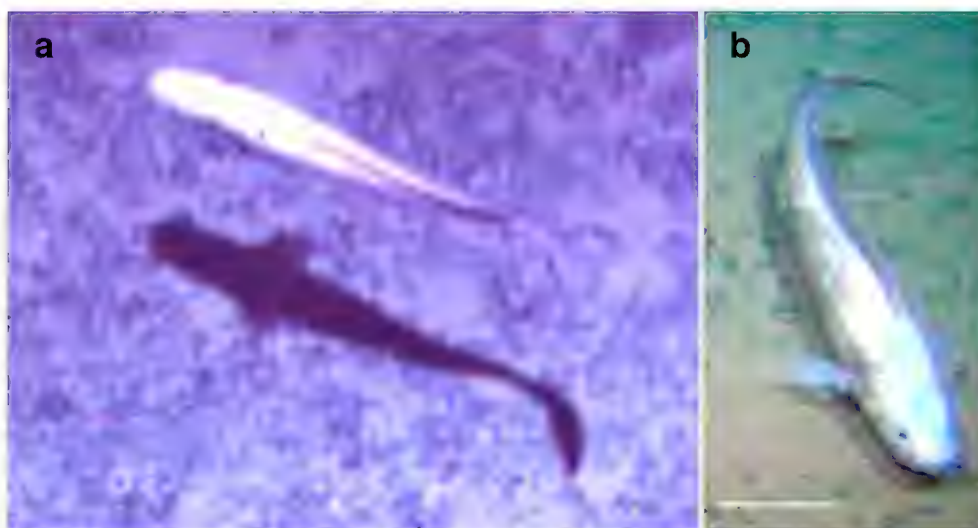


Figure 37.

cf. Ophidiidae morphospecies 1 observed in the UK-1 exploration contract area. Images (a-b) correspond with the relevant data above.

a: cf. Ophidiidae morphospecies 1 swimming above the seafloor. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: cf. Ophidiidae morphospecies 1 swimming above the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

cf. Ophidiidae morphospecies 2

Material

- a. scientificName: Ophidiidae sp.; taxonConceptID: cf. Ophidiidae morphospecies 2; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 3605; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4353; decimalLongitude: -116.5533; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-09; eventTime: 19:15; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA09; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers.

2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Angular head with lighter coloration along lower jaw. Rectangular body shape that maintains near maximum body depth for most of standard length. Dark contiguous dorsal and anal fins. Observed to drag body over sediment and leave a trail.

Fig. 38



Figure 38. [doi](https://doi.org/10.1016/j.dsr.2017.04.017)

cf. Ophidiidae morphospecies 2 in situ on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: A Leitner & J Drazen, University of Hawai'i.

cf. Ophidiidae morphospecies 3

Nomenclature:

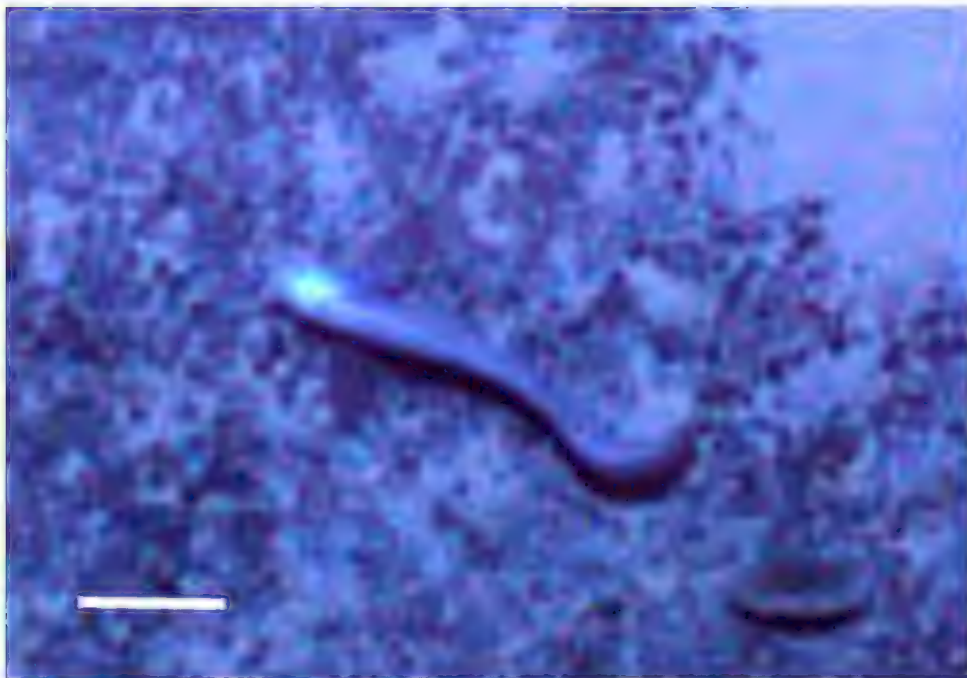
In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as "Ophidiidae morphotype 3".

Material

- a. scientificName: Ophidiidae sp.; taxonConceptID: cf. Ophidiidae morphospecies 3; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4248; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4848; decimalLongitude: -116.6549; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-04; eventTime: 10:12; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Slender fish with large and distinctive pectoral fins. Usually a grey in colour.

Fig. 39

Figure 39. [doi](#)

cf. Ophiidiidae morphospecies 3 in situ on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institutio.

cf. Ophiidiidae morphospecies 4

Materials

- a. scientificName: Ophiidiidae sp.; taxonConceptID: cf. Ophiidiidae morphospecies 4; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophiidiiformes; family: Ophiidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4251; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4957; decimalLongitude: -116.6505; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-04; eventTime: 1:09; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: Ophiidiidae sp.; taxonConceptID: cf. Ophiidiidae morphospecies 4; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophiidiiformes; family: Ophiidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4211; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5726; decimalLongitude: -116.7342; geodeticDatum: WGS84;

coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 7:43; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Rounded bulbous head. Blue/purple to brown coloration.

Fig. 40

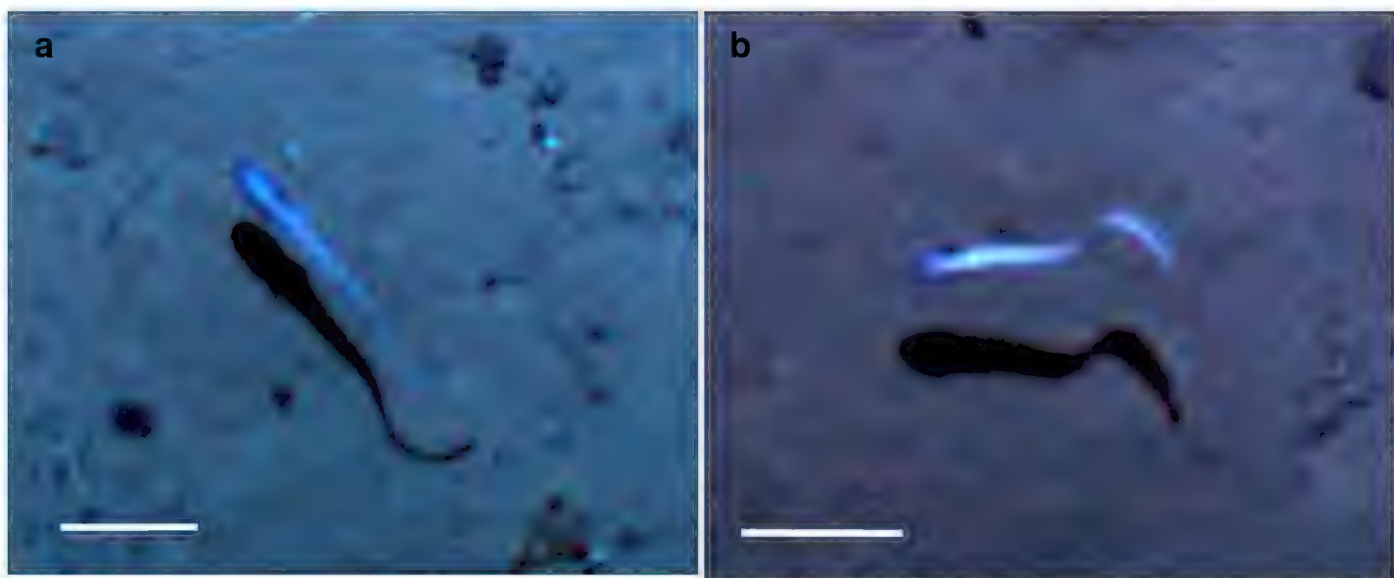


Figure 40.

cf. Ophiidiidae morphospecies 4 observed in the UK-1 exploration contract area. Images (a-b) correspond with the relevant data above.

a: cf. Ophiidiidae morphospecies 4 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: cf. Ophiidiidae morphospecies 4 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

cf. Ophiidiidae morphospecies 5

Materials

- a. scientificName: Ophiidiidae sp.; taxonConceptID: cf. Ophiidiidae morphospecies 5; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophiidiiformes; family: Ophiidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4161; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.3681; decimalLongitude: -116.5187; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-02-18; eventTime: 16:22; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 1 (AV01); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler;

occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- b. scientificName: Ophidiidae sp.; taxonConceptID: cf. Ophidiidae morphospecies 5; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: family; scientificNameAuthorship: Rafinesque, 1810; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4229; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5793; decimalLongitude: -116.7205; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 6:01; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Bright white coloration. Small head. Dorsal fin insertion at half body length.

Fig. 41

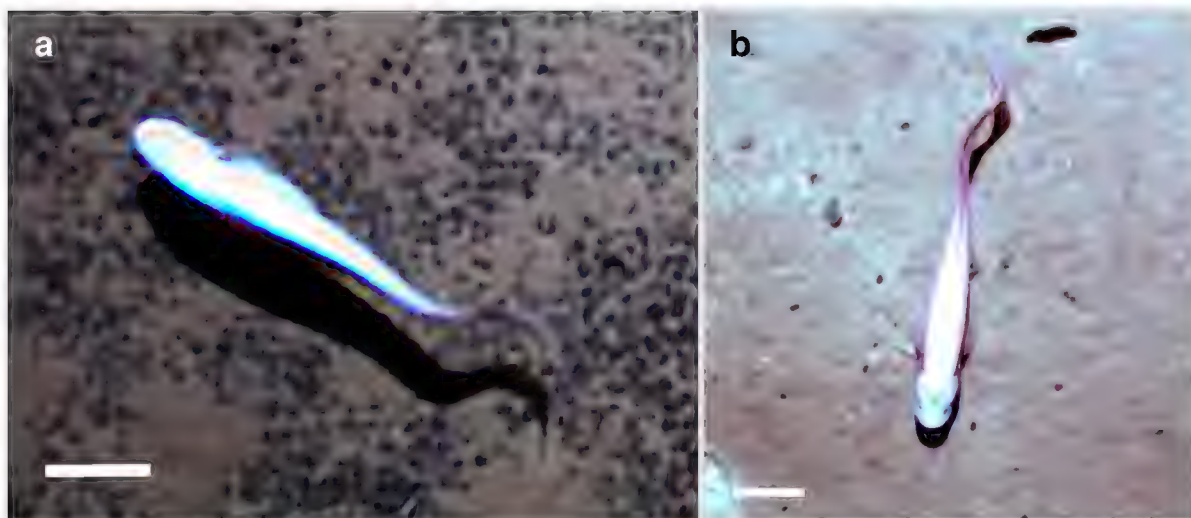


Figure 41.

cf. Ophidiidae morphospecies 5 observed in the UK-1 exploration contract area. Images (a-b) correspond with the relevant data above.

a: cf. Ophidiidae morphospecies 5 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: cf. Ophidiidae morphospecies 5 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

Genus *Barathrites* Zugmayer, 1911

Barathrites cf. *iris* Zugmayer, 1911

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as “Ophidiidae morphotype 2”.

Material

- a. scientificName: *Barathrites iris*; taxonConceptID: *Barathrites* cf. *iris*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: species; genus: *Barathrites*; scientificNameAuthorship: Zugmayer, 1911; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4212; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5126; decimalLongitude: -116.6224; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-03; eventTime: 21:13; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA06; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.05](https://doi.org/10.1016/j.dsr.2017.05); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 42



Figure 42. [doi](https://doi.org/10.1016/j.dsr.2017.05)

Barathrites cf. *iris* swimming above the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: A Leitner & J Drazen, University of Hawai'i.

Notes: Often bright white or mottled white/brown. Head small with distinct snout and curved downturned mouth. Relatively deep-bodied. Pelvic fins reduced to two rays each and under head forward of gill slit. Readily distinguished from other ophidiids by head morphology and body depth.

Genus *Bassozetus* Gill, 1883

Bassozetus cf. *nasus* Garman, 1899

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as “Ophidiidae morphotype 4”.

Materials

- a. scientificName: *Bassozetus nasus*; taxonConceptID: *Bassozetus* cf. *nasus*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: species; genus: *Bassozetus*; scientificNameAuthorship: Garman, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4070; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7603; decimalLongitude: -116.4677; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:16; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Bassozetus nasus*; taxonConceptID: *Bassozetus* cf. *nasus*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: species; genus: *Bassozetus*; scientificNameAuthorship: Garman, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4225; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5778; decimalLongitude: -116.7241; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 11:50; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler;

occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- c. scientificName: *Bassozetus nasus*; taxonConceptID: *Bassozetus* cf. *nasus*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: species; genus: *Bassozetus*; scientificNameAuthorship: Garman, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4312; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5532; decimalLongitude: -116.5386; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-05; eventTime: 19:37; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA07; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Large round, bulbous head with a tadpole-like body morphology. Reduced eyes. A variety of colormorphs exist ranging from beige to dark brown. May have lighter spots. Single dorsal contiguous with anal fin. Pelvic fins reduced to one ray each and below head. Distinguished from other ophidiids by the large rounded head.

Fig. 43



Figure 43.

Bassozetus cf. *nasus* observed in the UK-1 exploration contract area. Images (a-c) correspond with the data in (a) above, whereas images (d-e) correspond with the data in (b-c) respectively.

a: Side view of *Bassozetus* cf. *nasus* swimming above the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: Front view of *Bassozetus* cf. *nasus* swimming above the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: Side view of *Bassozetus* cf. *nasus* swimming above the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

d: *Bassozetus* cf. *nasus* swimming above the seafloor. Scale is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

e: *Bassozetus* cf. *nasus* swimming above the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

Genus *Bathyonus* Goode & Bean, 1885

Bathyonus cf. *caudalis* Garman, 1899

Materials

- a. scientificName: *Bathyonus caudalis*; taxonConceptID: *Bathyonus* cf. *caudalis*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: species; genus: *Bathyonus*; scientificNameAuthorship: Garman, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4212; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5126; decimalLongitude: -116.6219; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-03; eventTime: 21:13; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA06; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Bathyonus caudalis*; taxonConceptID: *Bathyonus* cf. *caudalis*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Ophidiiformes; family: Ophidiidae; taxonRank: species; genus: *Bathyonus*; scientificNameAuthorship: Garman, 1899; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3956; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4144; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 13:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Very long tapered body. Usually golden brown in color. Lower rays of pectoral fins free and stronger than upper ones. No prominent spines on head. Pelvic fins reduced to two rays each and below head. Easily distinguished from other ophidiids by the large length to body depth ratio and the free pectoral fin rays.

Fig. 44

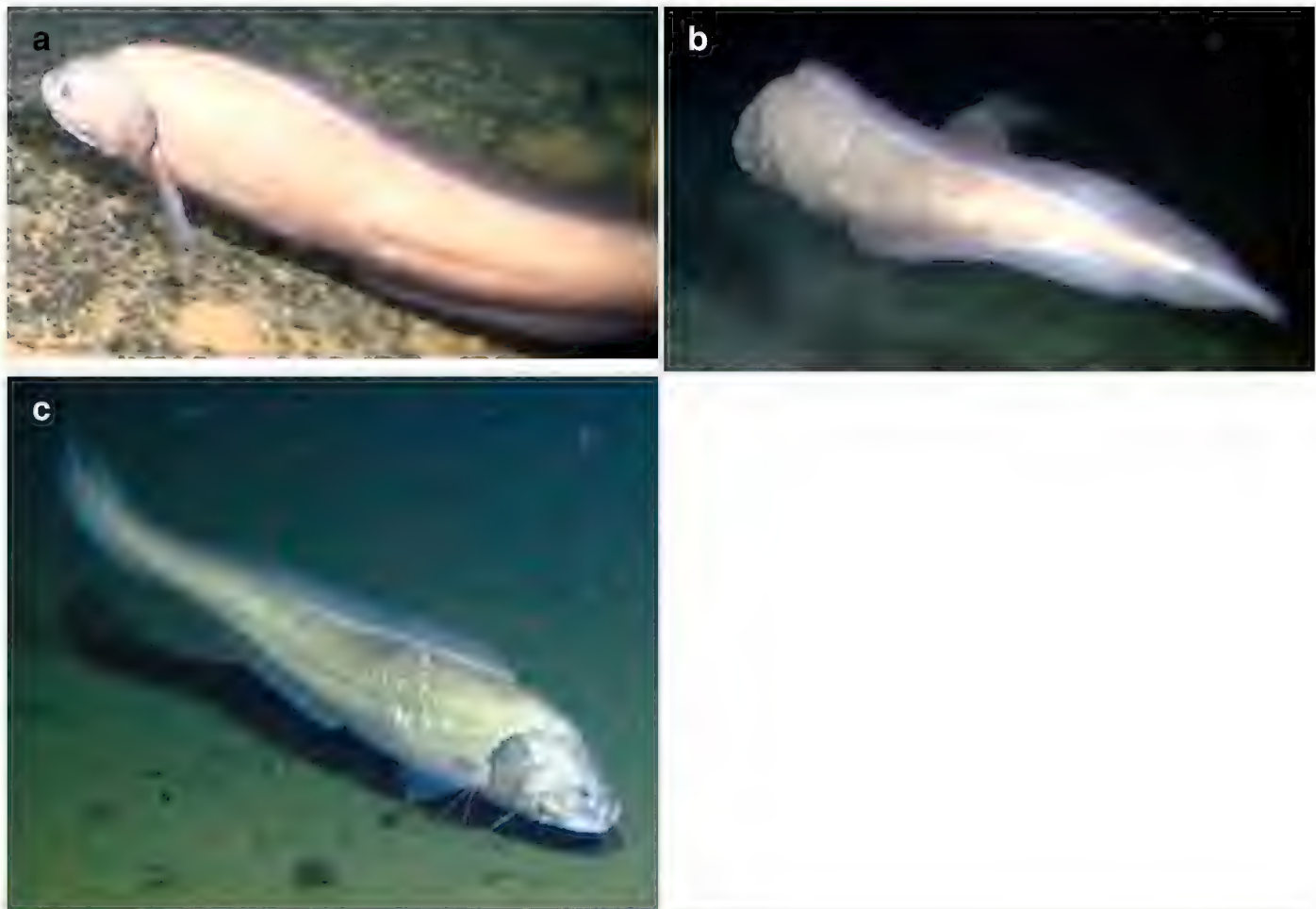


Figure 44.

Bathyonus cf. *caudalis* observed in the UK-1 exploration contract area and eastern CCZ. Images (a-b) correspond with the data in (a) above, whereas image (c) corresponds with the data in (b) above.

a: *Bathyonus* cf. *caudalis* swimming above the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

b: *Bathyonus* cf. *caudalis* swimming above the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

c: *Bathyonus* cf. *caudalis* swimming above the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

Order Perciformes

Family Zoarcidae Swainson, 1839

cf. Zoarcidae morphospecies 1

Material

- a. scientificName: Zoarcidae sp.; taxonConceptID: cf. Zoarcidae morphospecies 1; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Perciformes; family: Zoarcidae; taxonRank: family; scientificNameAuthorship: Swainson, 1839; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4236;

locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4526; decimalLongitude: -116.6488; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-07; eventTime: 17:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA08; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.05](https://doi.org/10.1016/j.dsr.2017.05); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: White to grey stout, eel-like body. Small body size. Very rounded head. Usually adopts a curled body position. Distinguished by small size and head morphology.

Fig. 45



Figure 45. [doi](#)

cf. Zoarcidae morphospecies 1 in situ on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: A Leitner & J Drazen, University of Hawai'i.

cf. Zoarcidae morphospecies 2

Material

- a. scientificName: Zoarcidae sp.; taxonConceptID: cf. Zoarcidae morphospecies 2; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Perciformes; family: Zoarcidae; taxonRank: family; scientificNameAuthorship: Swainson, 1839; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4312; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5532;

decimalLongitude: -116.5586; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-05; eventTime: 19:37; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA07; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.05](https://doi.org/10.1016/j.dsr.2017.05); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Stout eel-like body. Distinguished from *Pachycara nazca* by relatively more pointed, slender head and dark dorsal and anal fin edges.

Fig. 46



Figure 46.

cf. Zoarcidae morphospecies 2 observed in the UK-1 exploration contract area. Images (a-b) correspond with the data in (a) above.

a: cf. Zoarcidae morphospecies 2 in situ on the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

b: Front view of cf. Zoarcidae morphospecies 2 in situ on the seafloor. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

Genus *Pachycara* Zugmayer, 1911

Pachycara cf. *nazca* Anderson & Bluhm, 1997

Materials

- a. scientificName: *Pachycara nazca*; taxonConceptID: *Pachycara* cf. *nazca*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Perciformes; family: Zoarcidae;

- taxonRank: species; genus: *Pachycara*; scientificNameAuthorship: Anderson & Bluhm, 1997; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4070; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.7605; decimalLongitude: -116.4679; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-18; eventTime: 2:24; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (RV05); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Pachycara nazca*; taxonConceptID: *Pachycara nazca*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Perciformes; family: Zoarcidae; taxonRank: species; genus: *Pachycara*; scientificNameAuthorship: Anderson & Bluhm, 1997; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4106; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.9022; decimalLongitude: -116.5742; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Trap; eventDate: 2013-10-20; eventTime: 7:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: TR06; individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; catalogNumber: AB1-TR06-fish-1; recordNumber: AB1-TR06-fish-1; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler, Eric Anderson; dateIdentified: 2014; identificationRemarks: Identified by morphology of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: *Pachycara nazca*; taxonConceptID: *Pachycara nazca*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Perciformes; family: Zoarcidae; taxonRank: species; genus: *Pachycara*; scientificNameAuthorship: Anderson & Bluhm, 1997; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum A; maximumDepthInMeters: 4106; locationRemarks: RV Melville Cruise MV1313;

decimalLatitude: 13.9022; decimalLongitude: -116.5742; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Trap; eventDate: 2013-10-20; eventTime: 7:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: TR06; individualCount: 1; lifeStage: Adult; preparations: tissue and DNA voucher stored in 80% non-denatured ethanol aqueous solution and remainder of animal preserved in 4% formaldehyde; catalogNumber: AB1-TR06-fish-2; recordNumber: AB1-TR06-fish-2; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler, Eric Anderson; dateIdentified: 2014; identificationRemarks: Identified by morphology of collected specimen; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

- d. scientificName: *Pachycara nazca*; taxonConceptID: *Pachycara* cf. *nazca*; kingdom: Animalia; phylum: Chordata; class: Actinopterygii; order: Perciformes; family: Zoarcidae; taxonRank: species; genus: *Pachycara*; scientificNameAuthorship: Anderson & Bluhm, 1997; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4263; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4526; decimalLongitude: -116.6488; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 50; samplingProtocol: Baited Camera; eventDate: 2015-03-07; eventTime: 17:06; habitat: Abyssal polymetallic-nodule field; fieldNumber: CA08; individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Jeffrey Drazen, Astrid Leitner; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); Leitner A, Neuheimer A, Donlon E, Smith CR, Drazen JC. Environmental and bathymetric influences on abyssal bait-attending communities of the Clarion Clipperton Zone. Deep Sea Research Part I: Oceanographic Research Papers. 2017. doi: [10.1016/j.dsr.2017.04.017](https://doi.org/10.1016/j.dsr.2017.04.017); identifiedBy: Astrid Leitner, Jeffrey Drazen, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Large, deep-bodied eel-like shape. Large prominent lips and small rounded eyes. Large, rounded bulbous head. Smooth, scale-less appearance. Very round, large pectoral fins. Colors range from grey to white. Distinguished from other zoarcid morphospecies by large size, rounded head and pectoral fins.

Fig. 47

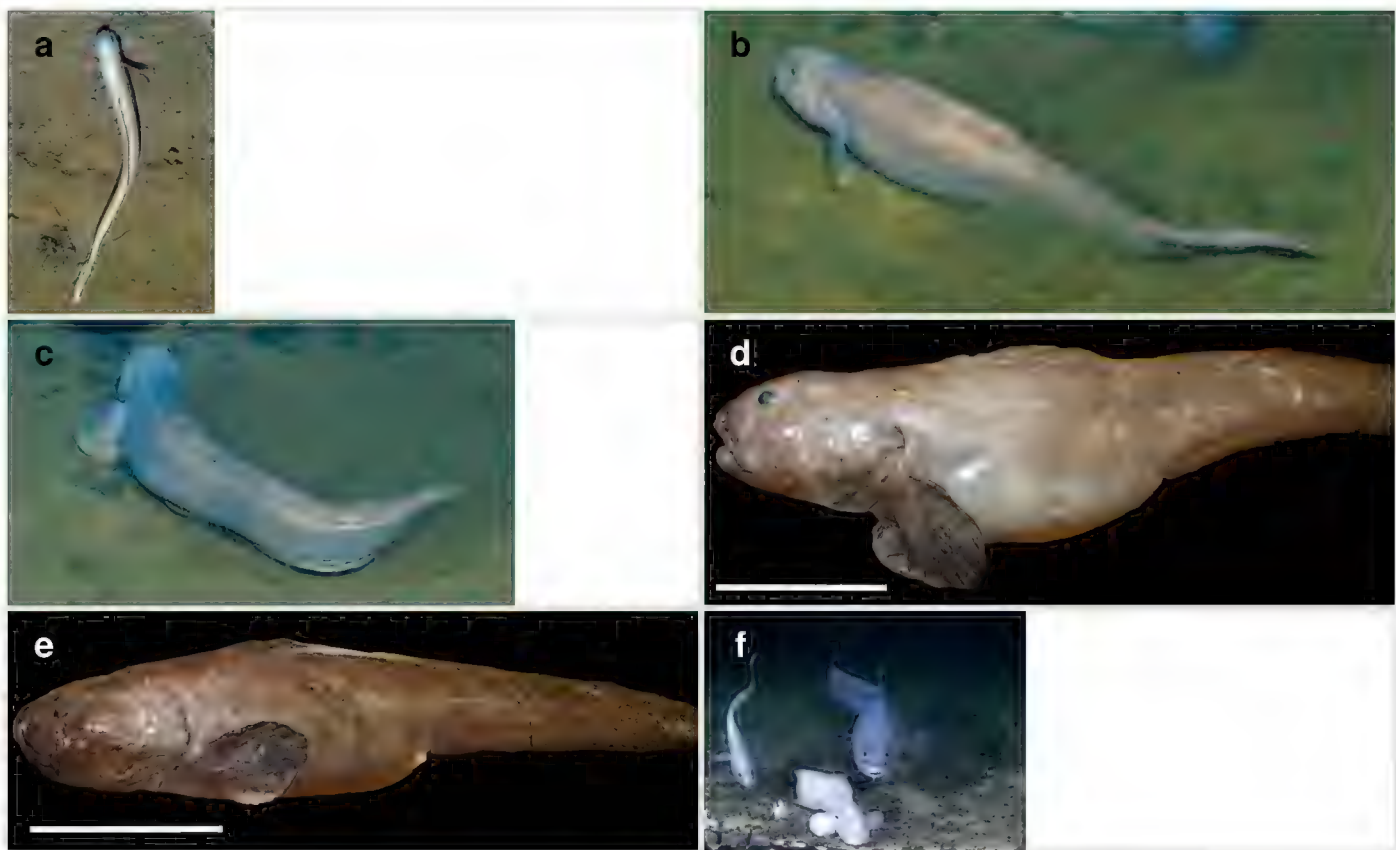


Figure 47.

Pachycara cf. *nazca* observed in the UK-1 exploration contract area and eastern CCZ. Image (a) corresponds with the data in (a) above, whereas images (b-c) correspond with the data in (b), and images (d-f) correspond with the data in (c-e) above.

a: *Pachycara* cf. *nazca* in situ on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: *Pachycara* cf. *nazca* in situ on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: *Pachycara* cf. *nazca* in situ on the seafloor. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

d: *Pachycara nazca* after collection via baited trap from the UK-1 exploration contract area. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

e: *Pachycara nazca* after collection via baited trap from the UK-1 exploration contract area. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

f: *Pachycara* cf. *nazca* (middle) in situ on the seafloor with two *Coryphaenoides* fish swimming above. Image attribution: A Leitner & J Drazen, University of Hawai'i. [doi](#)

Ctenophores of the UKSRL exploration contract area (UK-1) and the eastern Clarion-Clipperton Zone

Phylum Ctenophora Eschscholtz, 1829

Class Tentaculata Eschscholtz, 1825

Order Cydippida Gegenbaur, 1856

Family Mertensiidae L. Agassiz, 1860

cf. Mertensiidae morphospecies

Material

- a. scientificName: Mertensiidae sp.; taxonConceptID: cf. Mertensiidae morphospecies; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Cydippida; family: Mertensiidae; taxonRank: family; scientificNameAuthorship: L. Agassiz, 1860; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4244; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.49983; decimalLongitude: -116.640175; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 9:35; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Two long tentacles with filamentous side branches. Elongate body (length >twice width) tinged red throughout with gut darker. Comb rows extending over almost whole body length. Aboral end from which tentacles protude with sunken statocyst.

Fig. 48



Figure 48. [doi](#)

cf. Mertensiidae morphospecies observed swimming above the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Order Lobata Eschscholtz, 1825

cf. Lobata morphospecies 1

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as “Unknown Ctenophora morphotype 1”.

Material

- a. scientificName: Lobata sp.; taxonConceptID: cf. Lobata morphospecies 1; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Lobata; taxonRank: order; scientificNameAuthorship: Eschscholtz, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4235; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.496153; decimalLongitude: -116.636375; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 9:41; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Whitish to transparent body with large, fleshy, rounded oral lobes but lacking auricles. Body flattened in tentacular plane. Stomodaeum not pigmented.

Fig. 49



Figure 49. [doi](#)

cf. Lobata morphospecies 1 observed swimming above the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: Woods Hole Oceanographic Institution.

cf. Lobata morphospecies 2

Material

- a. scientificName: Lobata sp.; taxonConceptID: cf. Lobata morphospecies 2; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Lobata; taxonRank: order; scientificNameAuthorship: Eschscholtz, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4253; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.495027; decimalLongitude: -116.650252; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 8:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Transparent body with large, rounded oral lobes. Body small in comparison with lobes. Possible pigmentation in canal system.

Fig. 50



Figure 50. [doi](#)

cf. Lobata morphospecies 2 observed swimming above the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: Woods Hole Oceanographic Institution.

cf. Lobata morphospecies 3

Materials

- a. scientificName: Lobata sp.; taxonConceptID: cf. Lobata morphospecies 3; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Lobata; taxonRank: order; scientificNameAuthorship: Eschscholtz, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4225; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.579361; decimalLongitude: -116.687346; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 3:27; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: Lobata sp.; taxonConceptID: cf. Lobata morphospecies 3; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Lobata; taxonRank: order; scientificNameAuthorship: Eschscholtz, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4224; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.579723; decimalLongitude: -116.727023; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 7:56; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: Lobata sp.; taxonConceptID: cf. Lobata morphospecies 3; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Lobata; taxonRank: order; scientificNameAuthorship: Eschscholtz, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4221; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.581477; decimalLongitude: -116.722308; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 10:13; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- d. scientificName: Lobata sp.; taxonConceptID: cf. Lobata morphospecies 3; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Lobata; taxonRank: order;

scientificNameAuthorship: Eschscholtz, 1825; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4226; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.579336; decimalLongitude: -116.723512; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 11:03; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Smoky pigmented body with very large, rounded oral lobes. Body width less than one-fourth of lobe width. Benthopelagic with lobes facing upwards.

Fig. 51

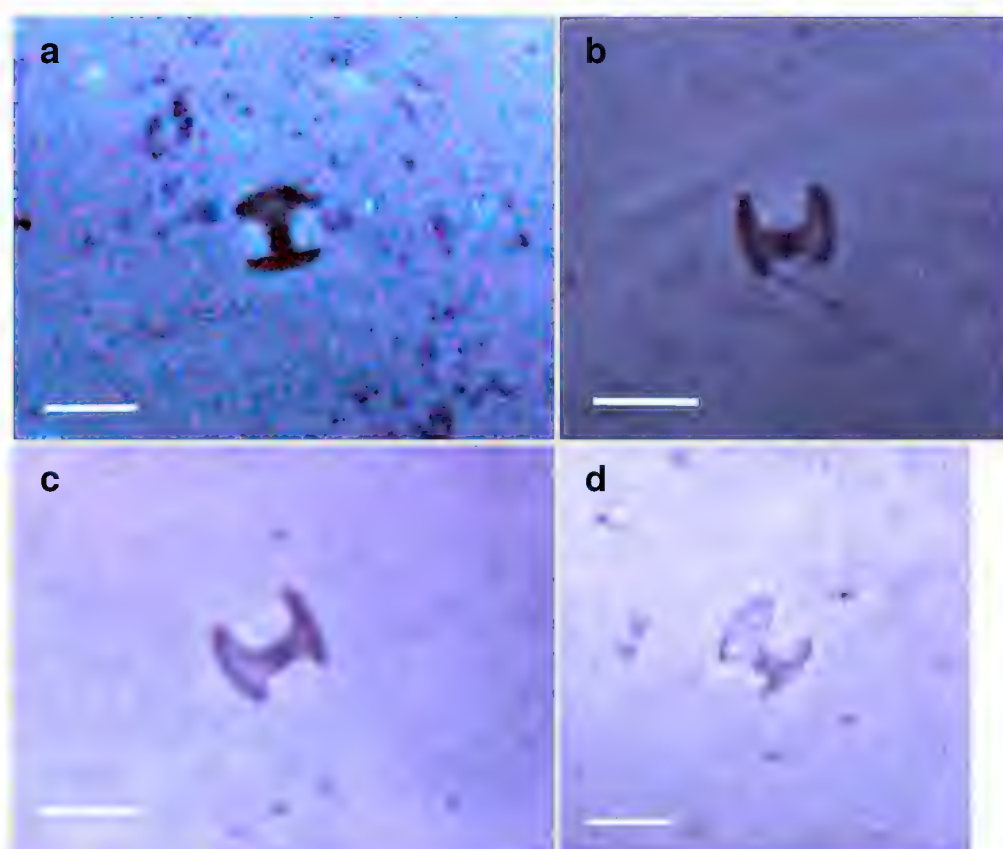


Figure 51.

cf. Lobata morphospecies 3 observed in the UK-1 exploration contract area. Images (a-d) correspond with the relevant data above.

a: cf. Lobata morphospecies 3 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: cf. Lobata morphospecies 3 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

c: cf. Lobata morphospecies 3 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

d: cf. Lobata morphospecies 3 swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

Family Lampoctenidae Harbison, Matsumoto & Robison, 2001**Genus *Lampocteis* Harbison, Matsumoto & Robison, 2001*****Lampocteis* cf. *cruentiventer* Harbison, Matsumoto & Robison, 2001****Material**

- a. scientificName: *Lampocteis cruentiventer*; taxonConceptID: *Lampocteis* cf. *cruentiventer*; kingdom: Animalia; phylum: Ctenophora; class: Tentaculata; order: Lobata; family: Lampoctenidae; taxonRank: species; genus: *Lampocteis*; scientificNameAuthorship: Harbison, Matsumoto & Robison, 2001; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4210; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.496693; decimalLongitude: -116.629775; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 9:57; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Dhugal Lindsay, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Dark red pigmented body flattened in tentacular plane. With no long filamentous tentacles. Long comb rows.

Fig. 52

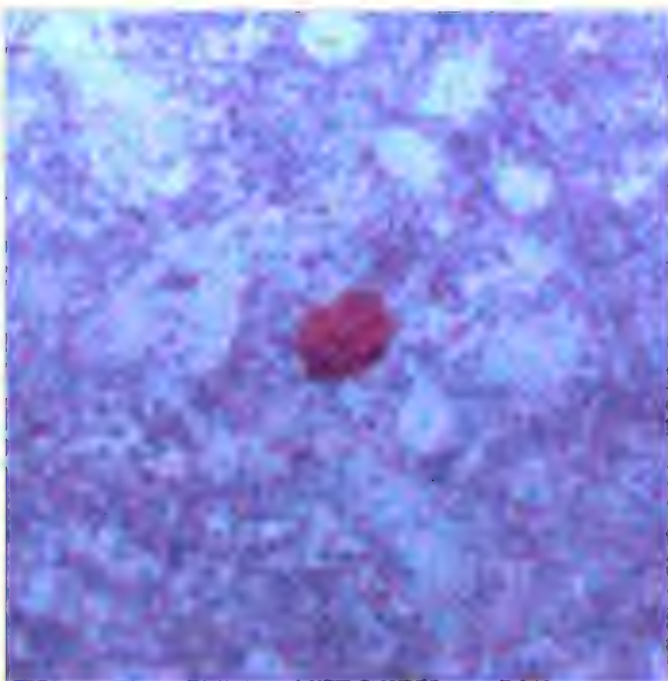


Figure 52. [doi](#)

Lampocteis cf. *cruentiventer* observed swimming above the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Image attribution: Woods Hole Oceanographic Institution.

Molluscs of the UKSRL exploration contract area (UK-1) and the eastern Clarion-Clipperton Zone

Phylum Mollusca Linnaeus, 1758

Class Bivalvia Linnaeus, 1758

cf. Bivalvia morphospecies

Materials

- a. scientificName: Bivalvia sp.; taxonConceptID: cf. Bivalvia morphospecies; kingdom: Animalia; phylum: Mollusca; class: Bivalvia; taxonRank: class; scientificNameAuthorship: Linnaeus, 1758; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3952; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6794; decimalLongitude: -114.4147; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 9:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: Bivalvia sp.; taxonConceptID: cf. Bivalvia morphospecies; kingdom: Animalia; phylum: Mollusca; class: Bivalvia; taxonRank: class; scientificNameAuthorship: Linnaeus, 1758; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB; maximumDepthInMeters: 3927; locationRemarks: RV Melville Cruise MV1313; decimalLatitude: 13.6789; decimalLongitude: -114.4093; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle; eventDate: 2013-10-23; eventTime: 10:47; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG, Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: Bivalvia sp.; taxonConceptID: cf. Bivalvia morphospecies; kingdom: Animalia; phylum: Mollusca; class: Bivalvia; taxonRank: class; scientificNameAuthorship: Linnaeus, 1758; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone;

locality: Eastern Clarion-Clipperton Zone; verbatimLocality: Site EPIRB;
 maximumDepthInMeters: 3945; locationRemarks: RV Melville Cruise MV1313;
 decimalLatitude: 13.6794; decimalLongitude: -114.4130; geodeticDatum: WGS84;
 coordinateUncertaintyInMeters: 25; samplingProtocol: Remotely Operated Vehicle;
 eventDate: 2013-10-23; eventTime: 10:06; habitat: Abyssal polymetallic-nodule field;
 fieldNumber: Dive 7 (RV07); individualCount: 1; lifeStage: Adult; preparations: Imaged
 only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler;
 occurrenceStatus: present; associatedReferences: Amon DJ, Ziegler AF, Dahlgren TG,
 Glover AG, Goineau A, Gooday AJ, Wiklund H, Smith CR. Insights into the abundance
 and diversity of abyssal megafauna in a polymetallic-nodule region in the eastern Clarion-
 Clipperton Zone. Scientific Reports. 2016;6. doi: [10.1038/srep30492](https://doi.org/10.1038/srep30492); identifiedBy: Janet
 Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2014; identificationRemarks:
 Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode:
 UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 53

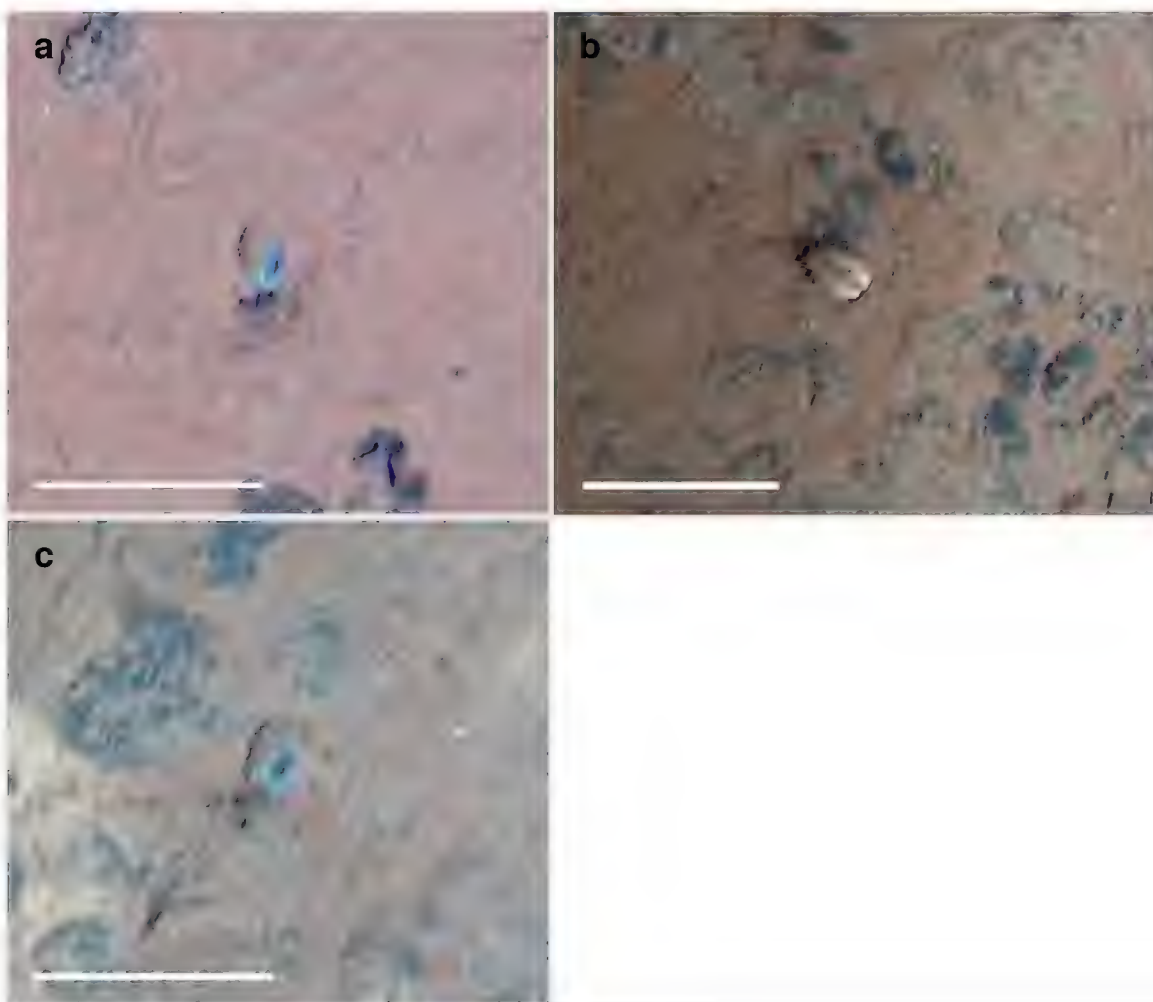


Figure 53.

cf. *Bivalvia* morphospecies observed in the eastern CCZ. Images (a-c) correspond with the relevant data above.

a: cf. *Bivalvia* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

b: cf. *Bivalvia* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

c: cf. *Bivalvia* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: DJ Amon & CR Smith, University of Hawai'i. [doi](#)

Notes: Infaunal, two-valves that meet at line; view in Fig. 53 a, c virtually into expanded siphon which is extended; Fig. 53b shows closed valves. Valve length enigmatically large (ca. 3-4 cm) for these depths, essentially 50% larger than expected.

Class Cephalopoda Cuvier, 1795

Order Octopoda Leach, 1818

Family Cirroteuthidae Keferstein, 1866

cf. Cirroteuthidae morphospecies

Nomenclature:

In the “Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone” created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as "*Cirroteuthis* morphotype".

Materials

- a. scientificName: Cirroteuthidae sp.; taxonConceptID: cf. Cirroteuthidae morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Cirroteuthidae; taxonRank: family; scientificNameAuthorship: Keferstein, 1866; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4225; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5819; decimalLongitude: -116.7209; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 11:07; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: Cirroteuthidae sp.; taxonConceptID: cf. Cirroteuthidae morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Cirroteuthidae; taxonRank: family; scientificNameAuthorship: Keferstein, 1866; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4233; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5341; decimalLongitude: -116.6039; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-18; eventTime: 16:00; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 9 (AV09); individualCount: 1; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified

- only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: Cirroteuthidae sp.; taxonConceptID: cf. Cirroteuthidae morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Cirroteuthidae; taxonRank: family; scientificNameAuthorship: Keferstein, 1866; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4254; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4932; decimalLongitude: -116.6517; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-04; eventTime: 0:31; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- d. scientificName: Cirroteuthidae sp.; taxonConceptID: cf. Cirroteuthidae morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Cirroteuthidae; taxonRank: family; scientificNameAuthorship: Keferstein, 1866; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4223; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5854; decimalLongitude: -116.7193; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 9:40; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Octopod with large paired fins emerging from lateral mantle, secondary web between the arms and primary web, and two rows of long cirri lateral to single row of arm suckers. Head about the same width as mantle. Mantle notably elongate, vague translucence. Distal arms often coiled aborally, exposing the secondary web.

Fig. 54

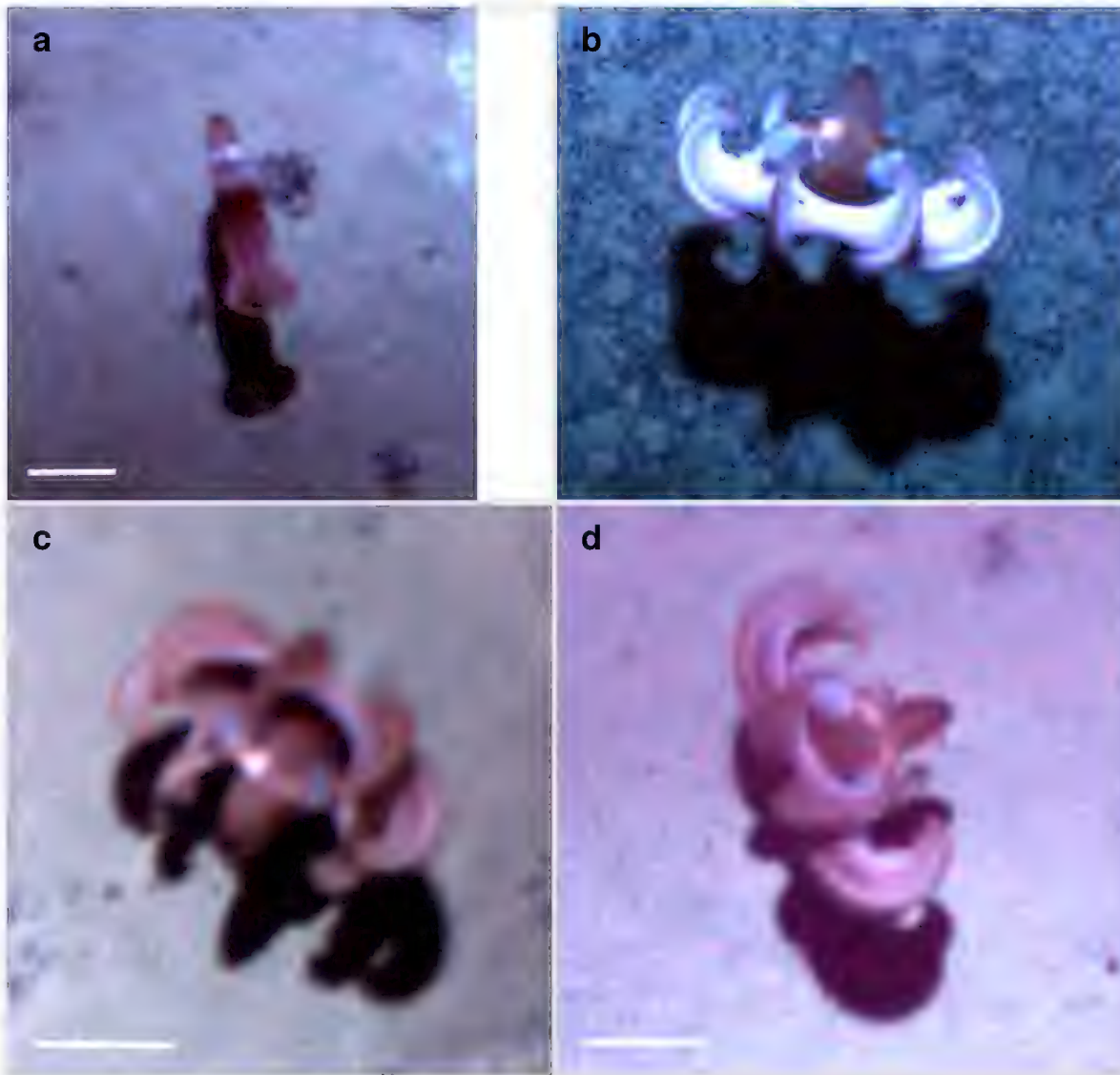


Figure 54.

cf. Cirroteuthidae morphospecies observed in the UK-1 exploration contract area. Images (a-d) correspond with the relevant data above.

a: cf. Cirroteuthidae morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: cf. Cirroteuthidae morphospecies swimming above the seafloor. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

c: cf. Cirroteuthidae morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

d: cf. Cirroteuthidae morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

Family Opisthoteuthidae Verrill, 1896

Genus *Grimpoteuthis* Robson, 1932

cf. *Grimpoteuthis* morphospecies

Nomenclature:

In the "Atlas of Abyssal Megafauna Morphotypes of the Clarion-Clipperton Fracture Zone" created for the ISA (<http://ccfzatlas.com/>), this morphospecies is listed as "*Grimpoteuthis* morphotype".

Materials

- a. scientificName: *Grimpoteuthis* sp.; taxonConceptID: cf. *Grimpoteuthis* morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Opisthoteuthidae ; taxonRank: genus; genus: *Grimpoteuthis*; scientificNameAuthorship: Robson, 1932; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4249; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.4983; decimalLongitude: -116.6453; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-03; eventTime: 22:05; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- b. scientificName: *Grimpoteuthis* sp.; taxonConceptID: cf. *Grimpoteuthis* morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Opisthoteuthidae ; taxonRank: genus; genus: *Grimpoteuthis*; scientificNameAuthorship: Robson, 1932; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4253; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5012; decimalLongitude: -116.6500; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-04; eventTime: 3:56; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 5 (AV05); individualCount: 1; preparations: Imaged only; behavior: Swimming; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- c. scientificName: *Grimpoteuthis* sp.; taxonConceptID: cf. *Grimpoteuthis* morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Opisthoteuthidae ; taxonRank: genus; genus: *Grimpoteuthis*; scientificNameAuthorship: Robson, 1932; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4209; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5720; decimalLongitude: -116.7349; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 7:42; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation
- d. scientificName: *Grimpoteuthis* sp.; taxonConceptID: cf. *Grimpoteuthis* morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Opisthoteuthidae ; taxonRank: genus; genus: *Grimpoteuthis*; scientificNameAuthorship:

Robson, 1932; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4224; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5879; decimalLongitude: -116.7167; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 9:44; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: <http://tolweb.org/Cirrata/20086>; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Fig. 55

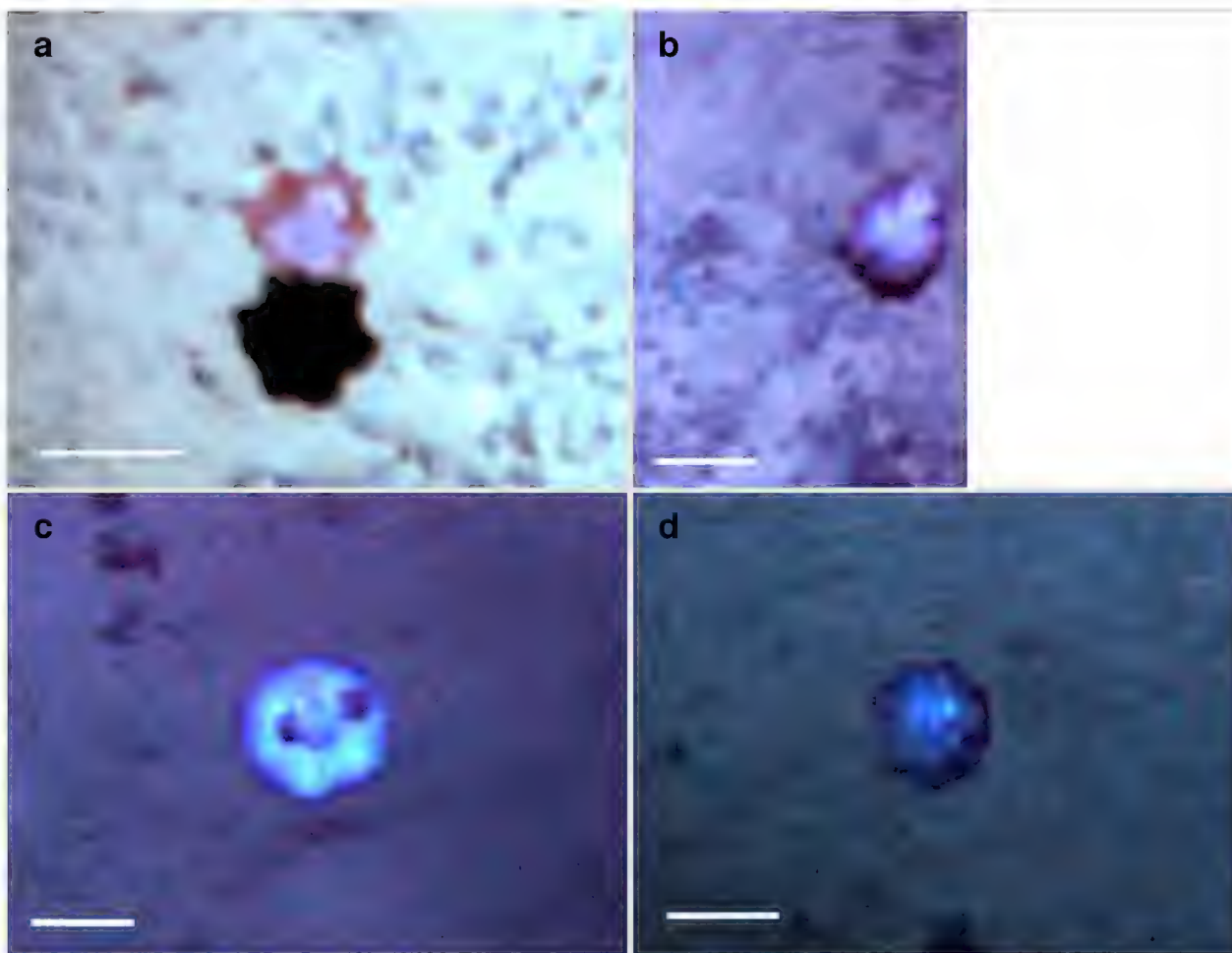


Figure 55.

cf. *Grimpoteuthis* morphospecies observed in the UK-1 exploration contract area. Images correspond with the data above.

a: cf. *Grimpoteuthis* morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

b: cf. *Grimpoteuthis* morphospecies swimming above the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

c: cf. *Grimpoteuthis* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

d: cf. *Grimpoteuthis* morphospecies in situ on the seafloor. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution. [doi](#)

Notes: Octopod with moderate-sized paired fins emerging from lateral mantle, simple interbranchial web, often two-toned with light mantle, darker arms/web, and two rows of cirri lateral to arm suckers. Arms often held nearly straight. Often seen near or on the seafloor.

Family Enteroctopodidae Strugnell, Norman, Vecchione, Guzik & Allcock, 2014

Genus *Muusoctopus* Gleadall, 2004

cf. *Muusoctopus* morphospecies

Material

- a. scientificName: *Muusoctopus* sp.; taxonConceptID: cf. *Muusoctopus* morphospecies; kingdom: Animalia; phylum: Mollusca; class: Cephalopoda; order: Octopoda; family: Enteroctopodidae; taxonRank: genus; genus: *Muusoctopus*; scientificNameAuthorship: Gleadall, 2004; waterBody: Pacific Ocean; stateProvince: Clarion-Clipperton Zone; locality: UK Seabed Resources Ltd exploration contract area (UK-1); verbatimLocality: UK-1 Stratum B; maximumDepthInMeters: 4225; locationRemarks: RV Thompson Cruise TN319; decimalLatitude: 12.5788; decimalLongitude: -116.6873; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 25; samplingProtocol: Autonomous Underwater Vehicle; eventDate: 2015-03-09; eventTime: 3:50; habitat: Abyssal polymetallic-nodule field; fieldNumber: Dive 6 (AV06); individualCount: 1; preparations: Imaged only; behavior: On seafloor; recordedBy: Diva J. Amon, Amanda F. Ziegler; occurrenceStatus: present; identifiedBy: Janet Voight, Diva J. Amon, Amanda F. Ziegler; dateIdentified: 2015; identificationReferences: Voight, Janet R. "Observations of deep-sea octopodid behavior from undersea vehicles." American Malacological Bulletin 24.1 (2008): 43-50.; identificationRemarks: Identified only from imagery; identificationQualifier: cf.; language: en; institutionCode: UHM; datasetName: ABYSSLINE; basisOfRecord: HumanObservation

Notes: Finless, benthic octopod with two rows of arm suckers, head narrower than mantle, arms coiled aborally when still, extended into sediment when walking. Swimming is propelled by mantle jets, not by fins. Ventrums often darker than dorsum, but not necessarily.

Fig. 56

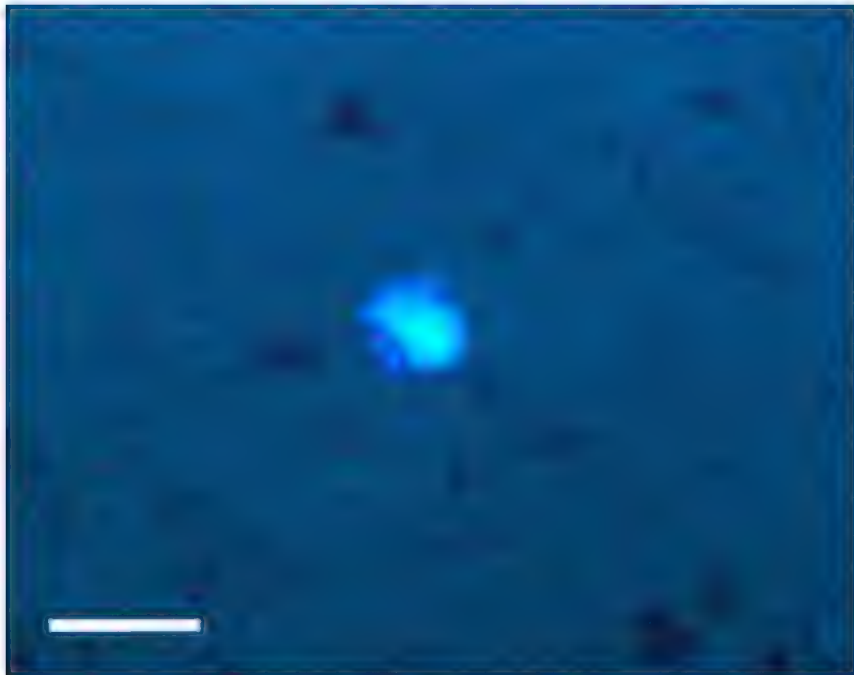


Figure 56. [doi](#)

cf. *Muusoctopus* morphospecies observed on the seafloor in the UK-1 exploration contract area. Image corresponds with the data above. Scale bar is 10 cm. Image attribution: Woods Hole Oceanographic Institution.

Discussion

Although many of the morphospecies included here remain taxonomically ambiguous, we provide the first image atlas of annelid, arthropod, bryozoan, chordate, ctenophore and mollusc morphospecies inhabiting the UK-1 exploration contract area and the eastern CCZ. At least 55 distinct morphospecies (8 Annelida, 12 Arthropoda, 4 Bryozoa, 22 Chordata, 5 Ctenophora, and 4 Mollusca) were observed, although this is likely an underestimate given the poor image quality and presence of cryptic species (Amon et al. 2016). When the echinoderm megafauna are included, at least 117 morphospecies from seven phyla are documented (Amon et al. 2017). This is the second-highest total species richness recorded in the CCZ region for these seven phyla. This is remarkable given that this total is from one exploration contract area (UK-1) and a single dive site east of the contract area, and currently excludes two of the most speciose phyla, Cnidaria and Porifera, which will be treated in separate atlases in the future (Amon et al. 2016, Amon et al. 2016, Foell and Pawson 1986, Leitner et al. 2017, Tilot 2006, Wang and Lu 2002). However, we recognise that the comparison of species richness for these seven phyla across the region is only valid if sampling effort was similar or standardised (Amon et al. 2016).

The numbers of annelid morphospecies in this study are similar to those in the only other CCZ megafauna study that includes annelids (Tilot 2006), although it is not clear whether there is overlap between these morphospecies. However, the number of arthropod morphospecies in Tilot (2006) (> 20) is considerably more than observed during this study and others in the CCZ (Amon et al. 2016, Foell and Pawson 1986, Leitner et al. 2017, Wang and Lu 2002). Interestingly, the observations of *Hymenopenaeus nereus* in the

UKSRL exploration area and at the EPIRB site represent a range extension for this species (Hendrickx and Wicksten 2016). Similarly, *Eurythenes magellanicus*, collected from the UKSRL exploration area and confirmed by molecular and morphological analyses, has been previously recorded only from the Drake Passage and Brazil Basin (d'Acoz and Havermens 2015), representing a significant range extension for this species.

Tilot (2006) recorded nearly 30 chordate morphospecies, the highest diversity in the CCZ thus far, though comparable to that recorded here. Leitner et al. (2017) observed eight bait-attending fish morphospecies from the first scavenging experiments in the CCZ. The quantitative study by Amon et al. (2016) which utilised many of the images from AB01 included in this study reported six fish morphospecies from UK-1 Stratum A and EPIRB only, which included both bait-attending and non-bait-attending. The total number of fish morphospecies from Amon et al. (2016) and Leitner et al. (2017) (11 morphospecies) equals the number in the CCFZ online atlas (Martinez-Arbizu et al. 2013), although morphospecies differ. The macrourid species *Coryphaenoides yaquinae* is known from the Pacific Ocean whereas *C. armatus* is thought to have a worldwide distribution (Jamieson et al. 2012), however Amon et al. (2016) and Leitner et al. (2017) were the first to report and confirm the presence of these species in the UKSRL exploration contract area. It should be noted that distinguishing between *C. armatus* and *C. yaquinae* in imagery is very difficult and so morphological and molecular analyses of specimens should be used to confirm identification. The presence of *Pachycara* cf. *nazca* in the UKSRL exploration contract area also represents a range extension for this species as it is previously known from the abyssal southeast Pacific Ocean off Peru (Anderson and Bluhm 1996).

The rarer megafaunal phyla in the CCZ appear to be the Bryozoa, Ctenophora and Mollusca but this study has recorded the highest diversities thus far for each of these phyla (four, five and four morphospecies respectively). Only one other megafaunal CCZ study has included bryozoans, with one species recorded (Foell and Pawson 1986). Previous studies identified between one and two ctenophore morphospecies in the CCZ (Martinez-Arbizu et al. 2013, Tilot 2006), whereas as many as five mollusc morphospecies have been observed. Between two and four cephalopod morphospecies (Foell and Pawson 1986, Martinez-Arbizu et al. 2013, Tilot 2006, Vecchione 2016, Wang and Lu 2002) have been recorded from elsewhere in the CCZ, however this may underestimate the cephalopod biodiversity as these highly mobile megafauna are able to evade ROVs and other imaging platforms. Megafaunal bivalves have only been mentioned briefly previously, perhaps because, like bryozoans, they are not observed easily in deep-sea imagery due to their small size (Amon et al. 2016, Tilot 2006, Wang and Lu 2002).

These morphospecies represent a range of functional traits: the serpulid and sabellid polychaetes and bryozoans are sessile suspension feeders, reliant on the polymetallic nodules as hard substrate, whereas most of the arthropods, chordates, cephalopods and ctenophores, are predatory (Amon et al. 2016, Amon et al. 2016, Leitner et al. 2017, Martinez-Arbizu et al. 2013). This differs from the echinoderms recorded in the UKSRL area and at the EPIRB site as most of those morphospecies were deposit feeders of suspension feeders (Amon et al. 2017). Approximately one third of the morphospecies in this atlas have been observed in other contract areas in the CCZ (Amon et al. 2016, Amon

et al. 2016, Foell and Pawson 1986, Leitner et al. 2017, Martinez-Arbizu et al. 2013, Tilot 2006, Vecchione 2016, Wang and Lu 2002), although this may be an overestimate given the presence of cryptic species and the problems identifying megafauna from imagery, as has been experienced during studies in other poorly-explored areas (Amon et al. 2016, Bickford et al. 2007, Linse et al. 2007, Vrijenhoek 2009). Information similar to that presented here will likely be crucial to informing the future environmental management of the region.

While this image atlas, as well as the echinoderm atlas (Amon et al. 2017), has expanded the knowledge of benthic fauna in the UK-1 exploration contract area and overall CCZ, there is still a need for further high-quality imagery of fauna, and especially physical megafaunal specimens to groundtruth the imaged morphospecies via detailed morphological and molecular analyses. We expect that a number of the morphospecies included in this atlas may be new to science, new records, or poorly known, but this can only be confirmed when specimens are collected and analysed. Molecular analyses are especially important given the presence of cryptic species. The limited collection of voucher specimens in the CCZ continues to severely hamper reliable estimation of species richness and species distributions. Although the taxonomic identification of preserved material is always necessary, we hope that this atlas will aid scientists by showing what these morphospecies look like in situ in their natural surroundings, as well as by providing some ecological information (e.g. feeding modes, preferred habitat etc.). This information will be important in estimating the human impact on this ecosystem. Furthermore, the appearance of morphospecies captured in situ in images can drastically differ from that of collected or preserved material, especially when relatively rudimentary collection equipment (trawls, dredges etc.) are used. As mentioned in Amon et al. (2016), those working in the CCZ must share detailed descriptions of their equipment and methods to facilitate data standardization and statistically-rigorous regional comparisons. It is also important that the ISA-sponsored online atlas continues to be updated with new imagery (such as the images in this atlas), and that the morphospecies are properly identified with the help of taxonomists.

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no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Author contributions

CRS designed the ABYSSLINE megafaunal studies and served as chief scientist on the AB01 and AB02 cruises. DJA and CRS directed ROV and AUV operations and megafaunal sampling. JD and AL directed baited-camera and baited-trap operations. DJA and AFZ were responsible for megafaunal processing at sea. DJA and AFZ processed and edited imagery and all specimens on shore, excluding the fish and arthropods samples, which AL and JD processed. MW identified the arthropods. AG identified the bryozoans. AL and JD identified the fish and the collected amphipods. CY identified the ascidians. DL identified the ctenophores and JV identified the molluscs. DJA wrote the main manuscript text and prepared the figures. DJA, CRS, AFZ, JD, AG, AL, DL, MW, JV and CY reviewed and edited the manuscript.

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Supplementary material

Suppl. material 1: Concise table of megafaunal morphospecies locations

Authors: DJ Amon

Data type: Occurrences

Filename: Location table.xlsx - [Download file](#) (57.96 kb)